FIRE ENGINEERING

The Journal of the Fire Protection Profession Since 1877

FIRE CHIEFS' CONFERENCE AND BUYERS' GUIDE ISSUE

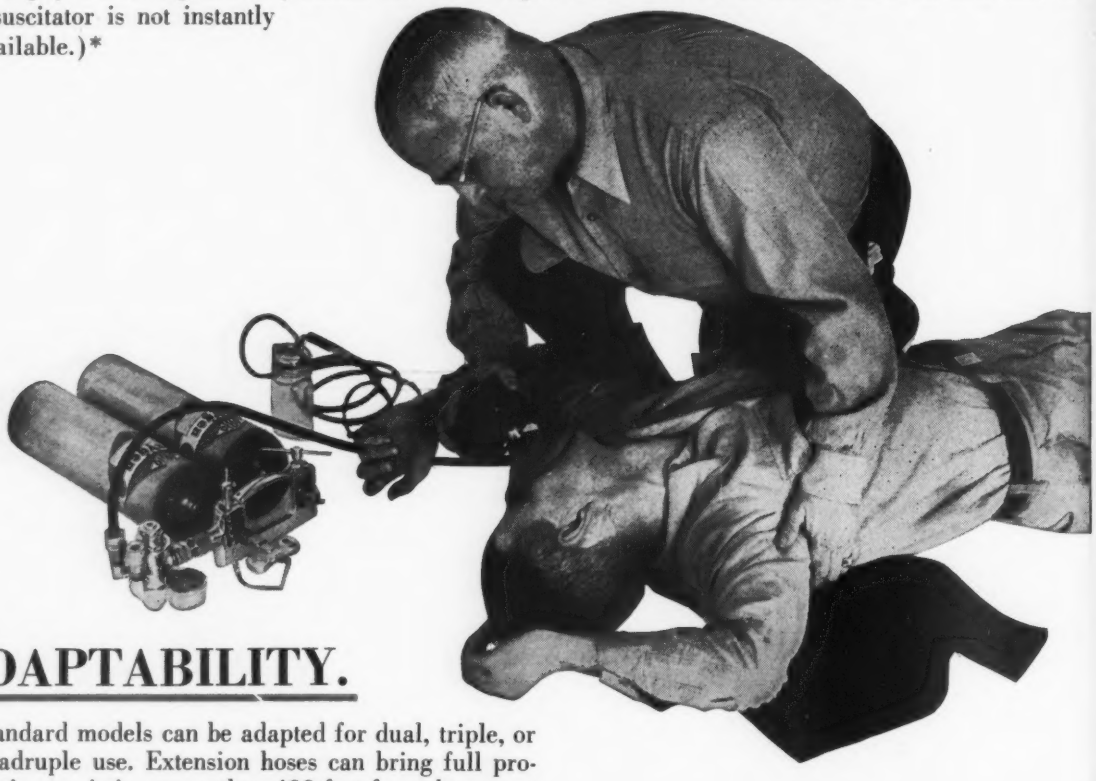
AUGUST, 1957

These Advantages Add Up!

SIMPLICITY. In breathing emergencies speed saves lives, and simplicity means speed. Emersons have it.

SAFETY. No instance has ever been recorded of injury from the gentle pressures used. Since approval by the American Medical Association in 1942 thousands of cases have been treated, all safely, including adults, children, and even newborn babies. An important safety factor is the suction phase, which gives vital aid to the circulation by helping the heart to fill normally.*

EFFECTIVENESS. Extensive medical research has found immediate positive-and-negative resuscitation to be the most effective life-saving measure in asphyxial emergencies. (Manual artificial respiration, however, should be used as first aid, if a resuscitator is not instantly available.)*



ADAPTABILITY.

Standard models can be adapted for dual, triple, or quadruple use. Extension hoses can bring full protection to victims more than 400 feet from the parent machine. Manifolds are available for Civil Defense protection.

Write for circular on the newest models.

****Write for free bulletins "Medical Reference on Resuscitation" and "A New Manual Method of Artificial Respiration."***

EMERSON RESUSCITATORS

Can Help You Save Lives

J. H. EMERSON COMPANY

22 COTTAGE PARK AVENUE, CAMBRIDGE 40, MASSACHUSETTS

Tenacity

BE SURE TO STOP AT BOOTH 59
September 8-12
I.A.F.C. at New Orleans

Here is a modern fire truck without frills; a concentration of quality and dependability built by Mack Trucks Inc. known as type B-505 rated at 500 gpm cap. and equipped with 200 hp engine. 1500 gal. booster, 2 top mounted booster reels and of course, protected with a FEDERAL Model 17 Beacon Ray light and a large FEDERAL lighted siren.

The Bulldog is well known for his tenacity in grabbing hold and never letting go.

The modern fire truck is like the Bulldog in *its* operation; on the move or while pumping, it will continue tenaciously, dependably and without rest until its task is completed.

The quality fire apparatus business is highly competitive and no manufacturer will load his trucks with high quality accessories unless they are specified!

Important accessories like the siren and warning light are vital in getting a truck and the men who ride it to the scene of an emergency quickly and safely. Don't accept *any* substitutions, *nothing but the best is good enough!*

And be sure to SPECIFY top quality FEDERAL Warning Equipment like the Class Q Siren and the Beacon Ray light for *your* apparatus.

Write for literature on FEDERAL Sirens and Beacon Ray lights.

FEDERAL SIGN and SIGNAL Corporation
8702 S. State St., Chicago 19, Ill.

FIRE ENGINEERING

VOL. 110 AUGUST, 1957 NO. 8

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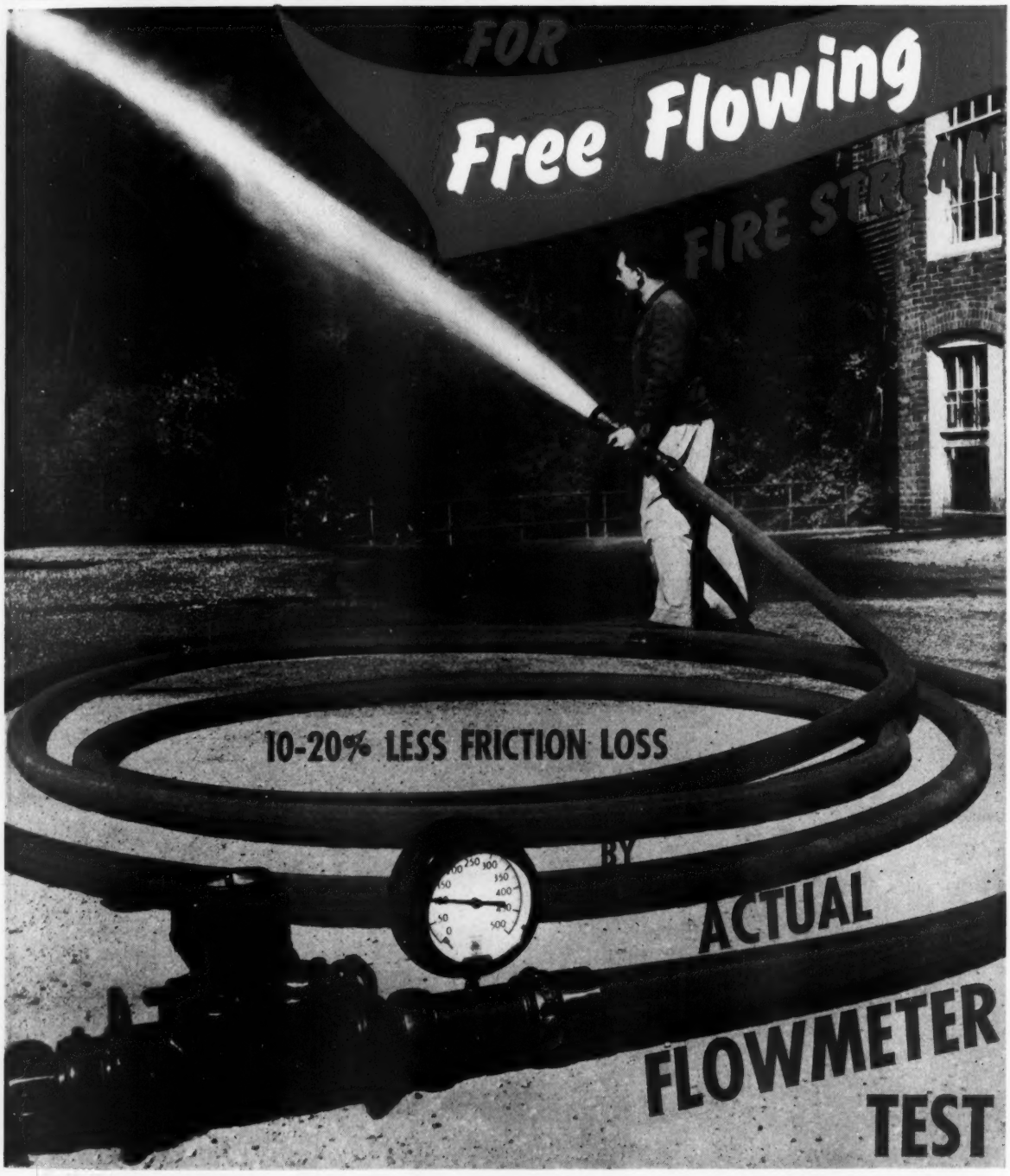

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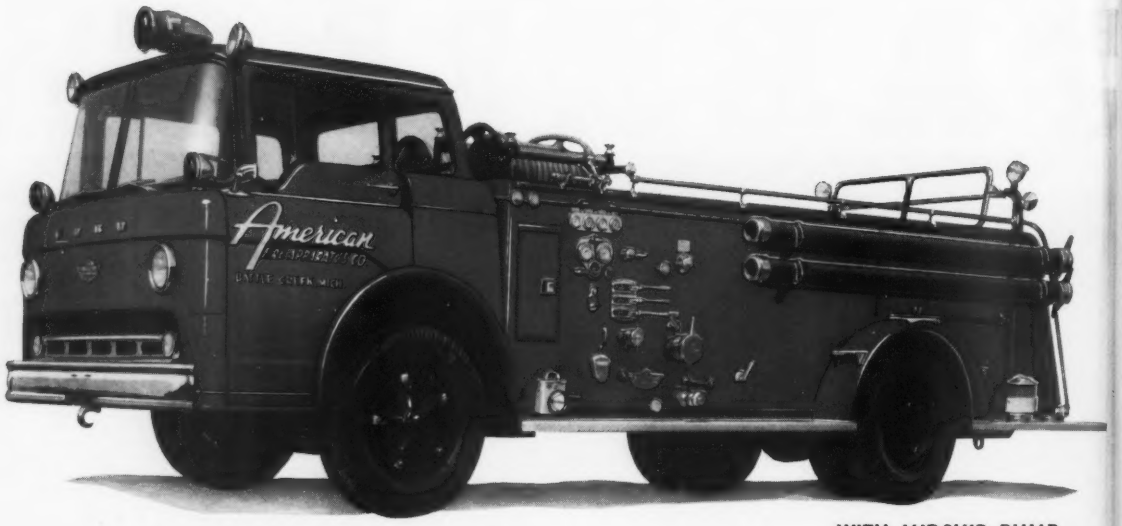

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a multi-stage midship or front-mounted pump... select the chassis and body *you* prefer on your American Fire Truck

You're in command when you come to American . . . because *you* select the combination that meets your community's needs.

For example, you select the make and model of commercial chassis you want—conventional or tilt cab, V-8 or six. Then you choose a dependable, high-performance Barton-American Pump—multi-stage midship or front-mounted.

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B.F.Goodrich Fire King is actually 22% lighter and much more flexible than ordinary hose. In Fire King, the "filler cords" which go around the hose and carry the load under pressure, are made with Dacron chemically-produced fiber. These cords are thinner yet stronger than cords used for reinforcement in ordinary hose.

Chief Dan Donovan (at left) of the Carmichael Fire District, Sacramento County, Calif., chose Fire King because it has the strength to take top pressures. This hose is tested at 600 pounds pressure, can stand up to twice as much pressure before bursting.

For areas where excess moisture is a problem, B.F.Goodrich has developed the exclusive Superseal protection for hose that makes it 10 times more resistant to mildew attack and rotting. Most treatments just coat the surface of the hose, but Superseal penetrates every cord of the inner and outer jacket, preparing the hose for all kinds of weather. Yet this protection costs no more than ordinary hose treatments.

When you want hose that's light, flexible, and will last longer than any other hose sold, get B.F.Goodrich hose with Superseal protection. Your B.F. Goodrich fire hose distributor can tell you more about it, or write *B.F.Goodrich Industrial Products Co., Dept. M-148, Akron 18, Ohio.*

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Increase your fire-fighting efficiency and safety with p

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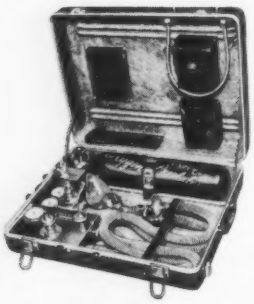

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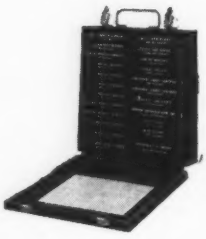

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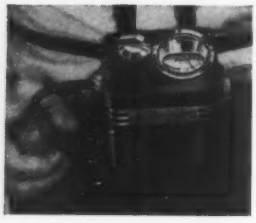
Designed to meet all the requirements of fire department service. Contents of the M.S.A. Kit are individually wrapped in cellophane to protect against dirt, dust and moisture. All-weather steel case design provides an added safeguard. A complete supply of emergency treatment for immediate application is contained in unit packages for quick location, individual treatment. Write for details.



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A compact, portable, easy-to-use instrument for checking suspected areas for explosive gases and vapors during fires and in general survey work. Body carrying straps, and one hand operation permit unhampered use. Easily read dial, rugged, simple to maintain. Write for details.

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proved M·S·A equipment

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... available with AIR or OXYGEN

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Here are a few of the construction details—

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... the high pressure hose is made of wire-inserted neoprene for increased wear.

... the redesigned cylinder valve connects directly to the cylinder and the improved working parts of the valve provide greater serviceability and less maintenance.

... the nylon harness is easily adjusted and provides maximum strength. It is highly chemical and water-resistant.

... the new color scheme is an attractive dark green and yellow. This striking appearance makes it easier to spot men in working areas. Write for details.

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☐ M.S.A. Chemox	☐ M.S.A. Air Mask

Name_____ Position_____

Fire Department_____

Address_____

City_____ Zone____ State_____

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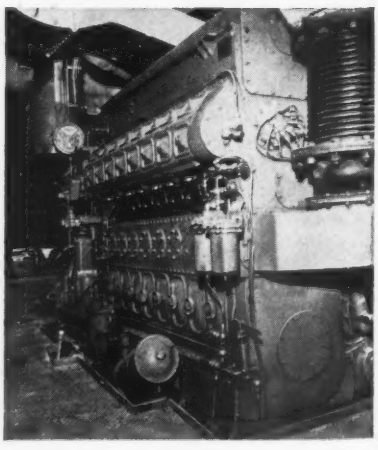
Fire alarms sounding today in Baltimore's expanding harbor area are quickly answered by the newest in fireboat performance. Cousin to land-based municipal pumping stations, the vessel is powered by a pair of 660 hp. Fairbanks-Morse Model 38F 5¼ Opposed-Piston Diesels. This highly maneuverable vessel sails smoothly at full speed, completely without vibration and crash-reverses in less than two lengths.

Another identical pair of O-P's power the two 10″ F-M fire pumps that can throw 12,500 g.p.m. at 150 lb. pressure.

Only compact Opposed-Piston power could provide this performance, yet keep weight down for higher top speed.

On a fireboat—in your municipal power or pumping station—when the need is for dependable power produced economically, you cannot match the standard set by Opposed-Piston diesels from 200 to 2400 horsepower. Fairbanks, Morse & Co., Dept. FE-8. Chicago 5, Illinois.



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PATENTS PENDING

the most modern fire and public emergency reporting system available . . . . .

CONFORMS TO THE HIGHEST DEGREE WITH THE NATIONAL BOARD OF FIRE UNDERWRITER'S REQUIREMENTS FOR MUNICIPAL FIRE ALARM SYSTEMS

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REDUCES FIRE LOSS!

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- These emergency circuits strung throughout the city are separate from existing telephone systems, thereby providing a distinct and separate channel of communications.
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- The system permits the use of voice for detailing the nature and location of fire, accident, robbery, or other emergency.
- Broken lines can't cause transmission failure—either voice or telegraphic signal
- Each box is supervised at the central control by means of constant current flow
- The cost of this multi-purpose emergency box is comparable to that of the single-purpose telegraph fire alarm box.
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The world's only multi-purpose disaster vehicle designed to meet all emergencies and individual requirements!

Individual—beautiful—the symbol of distinction—unrivalled quality—the satisfaction of knowing that a "Christopher" cannot be duplicated anywhere by anyone at any price.

Note the sleek and lovely lines—The elegant appointments and luxuriousness—quality product in every respect—You still want protection,—but also want style and comfort and with a touch of grace and elegance. All this is reflected in the Quality Trend which the American Fireman is passing back to Industry.

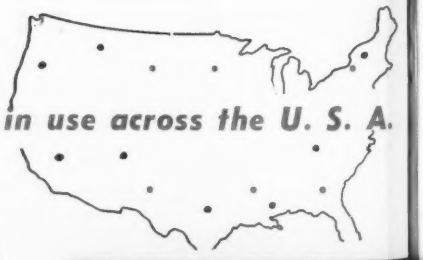
Stamp of individuality—When you buy a "Christopher" you are "quality buying." Note the distinguishing features—a vital element identifying it immediately as a "Christopher"

This unit now in operation with the Washington Fire Company No. 1 Conshohocken, Pa.

RES-Q combines 3 units in 1!

1. AMBULANCE + 2. SQUAD CAR +

3. RESCUE CAR = RES-Q*



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20 COMPARTMENTS FOR ALL TYPES OF EQUIPMENT

The following equipment carried by unit in photo above:

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- Assortment of bars
- Wire rope slings assorted sizes
- 3 lengths of chain
- 1 length of cable
- Extra oxygen bottles clipped to floor
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- 2—asbestos blankets
- 100 feet ¾ rope
- 7 wool blankets
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- 8000 lb. winch & cable
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- 7 safety helmets
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- 2 Red blinkers battery powered
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- I.D.M. inhalator
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- All service mask, extra cannisters
- Extra wire and 3 way junction box for lights and power tools

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SWEEPING THE FIRST 4 PLACES IN THE PRESERVATION OF LIFE AND PROPERTY!

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THE CHRISTOPHER COMPANY

Division of International Auto-Industries Corp.
100 Central Park South, New York 19, New York

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1. AMBULANCE + 2. SQUAD CAR +
3. RESCUE CAR* + 4. FIRE FIGHTER
= F.A.P.A.

units in use the world over

*Fire-Ambulance-Patrol-Auto (F.A.P.A. and RES-Q are covered by international design and functional patents).

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HERE IS THE FIRST OF 40 GOING TO VENEZUELA AND BRAZIL ➡

Carries 12 people as squad car. Four stretcher patients, as an ambulance. 150 to 200 gallons of water. Hale 200 gpm pump, and soft suction plus 1½" hose. Stainless steel foam tank with automatic proportioner to discharge 6,000 gallons of foam, for oil fires, Drafts from stream, hydrant or tanker on both sides of vehicle, plus booster reel on rear. Compartments for: Portable generator—portable pump—oxy-acetylene cutting outfit, flood lights, oxygen, respiratory equipment etc.

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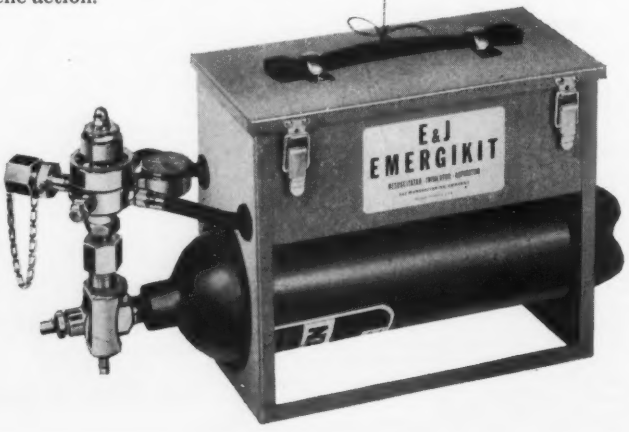

small light portable

Hit the Mark with INDIAN FIRE PUMPS!

Aim toward faster, more efficient fire fighting with back-pack INDIANS . . . the all 'round, clear water extinguishers with hundreds of uses. No upkeep cost. No chemicals to buy. Read what this fire chief says:

"We consider Indian Fire Pumps one of the most important pieces of equipment in our company. Just two days ago we saved a Dry Goods store and several other buildings with small water damage by using Indians.

Indians play a large part in extinguishing many of our fires and we intend to get more in the near future."

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BOTH TYPES APPROVED BY UNDERWRITERS LABORATORIES

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There is no substitute for top quality and experience and you get both at Braxmar.

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- Noted for dependability and high efficiency
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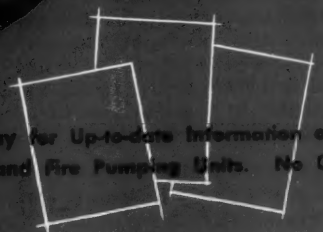
- Backed up by a broad line of efficient booster pumps, portable fire pumping units, valves and foam proportioners

HALE FIRE PUMPS are built in all STANDARD CAPACITIES

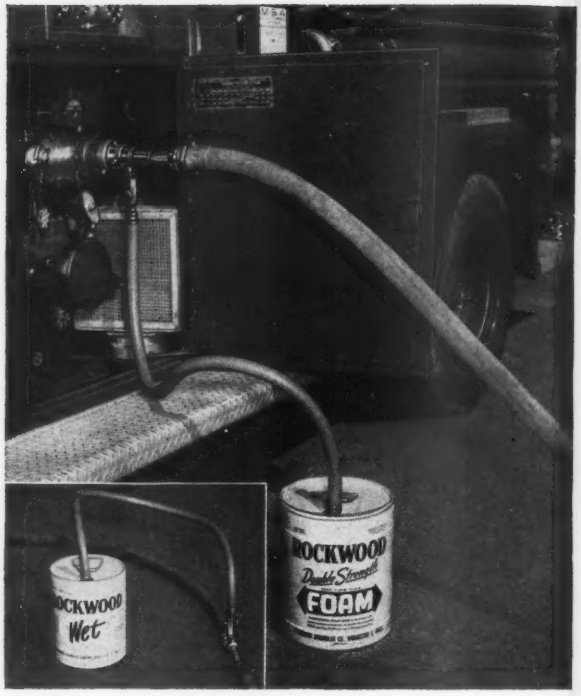


Write Today for Up-to-date Information on HALE Fire Pumps and Fire Pumping Units. No Obligation.

FIRE PUMPS HALE CONSHOHOCKEN, PA.

HALE Fire Pump Company
CONSHOHOCKEN, PA.

ROCKWOOD
built-in proportioning systems for municipal fire trucks



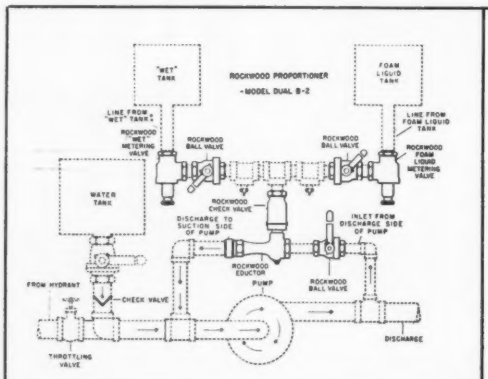
Rockwood's long, practical experience and constant research assures you the safest, most economical means of fighting all types of fires. These pages illustrate a few of Rockwood's family of products that are playing a vital part in fire fighting programs throughout America.

Rockwood's new Double Strength FOAM and Rockwood WET offer you many advantages

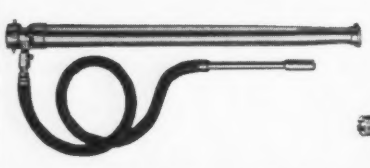
Double Strength FOAM has double foam-making capacity, cutting in half the transportation cost and storage space. It is faster spreading and flows freely — even at subzero temperatures. An outstanding FOAM liquid to go with Rockwood's advanced type of FogFOAM and FOAM Nozzle for quickly putting out fires in gasoline and other similar flammable liquids. Available in 5 gallon cans or 50 gallon drums.

Rockwood WET increases the spread and penetration of water into deep seated fires involving ordinary combustibles such as wood, paper, cloth, etc. It greatly reduces the water needed to extinguish such fires. Available in 50 gallon drums, 5 gallon and 1 gallon cans.

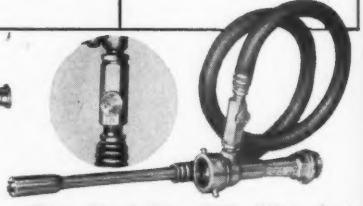
Regular FOAM and All Purpose FOAM are also available.



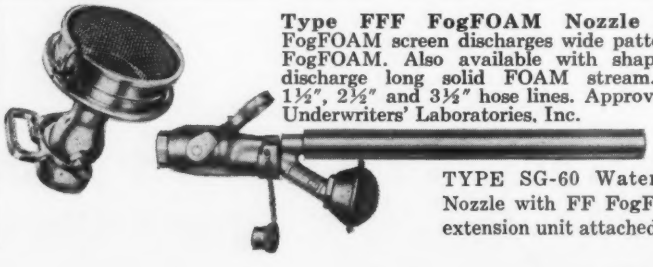
Proportioning System. Model B-2, around-the-pump proportioner. Used when pressure is maintained by pump. Custom-engineered systems are also available.



The F-501 Nozzle developed for use with 1½" hose to provide an economical means of applying a solid stream of FOAM on flammable liquid fires.



The Variable FW Metering-Check Valve with FW Eductor incorporates both the Metering Valve and Ball Check Valve in one unit and meters material into the hose line in any proportion from 1% through 6%.



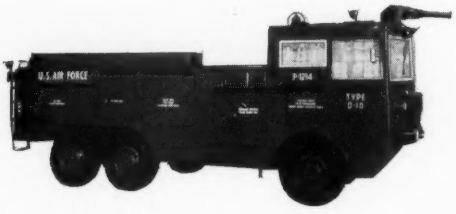
Type FFF FogFOAM Nozzle with FogFOAM screen discharges wide pattern of FogFOAM. Also available with shaper to discharge long solid FOAM stream. For 1½", 2½" and 3½" hose lines. Approved by Underwriters' Laboratories, Inc.

TYPE SG-60 WaterFOG Nozzle with FF FogFOAM extension unit attached

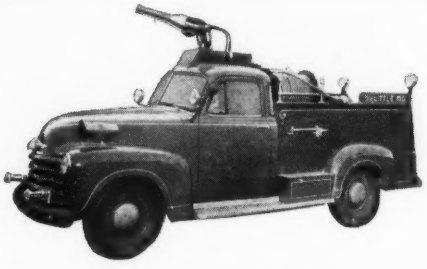
Rockwood offers you 4 types of turret control

...and any Rockwood turret gives you 4 types of discharge (1) FogFOAM, (2) Solid FOAM stream, (3) WaterFOG,(4) Solid water stream

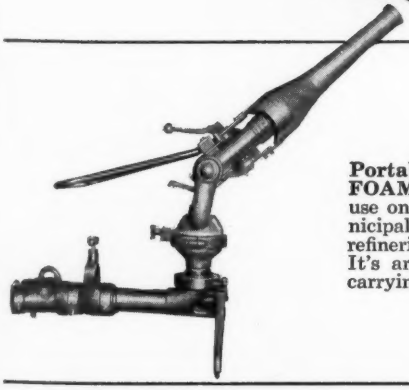
Remote Hydraulic Control Single Type FFF FogFOAM Turret Nozzle on Type 0-10 U. S. Air Force crash rescue fire fighting truck. Similar turrets can be supplied for oil refineries, chemical and industrial plants and municipalities. Hydraulically operated dual turrets also available.



Remote Manual Control Type FFF FogFOAM Turret Nozzle provides efficient operation of turret from driver's seat within truck cab — for small municipalities, airports or industrial properties where limited personnel is available.



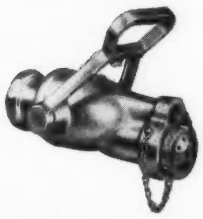
Direct Manual Control Dual Type FFF FogFOAM Turret Nozzles — can be operated directly by firemen from cab roof.



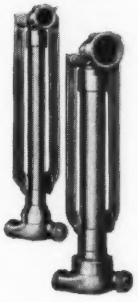
Portable Type FFF FogFOAM Turret Nozzle for use on fire hose lines by municipal fire departments, oil refineries and industrial plants. It's arranged for convenient carrying on fire trucks.

ROCKWOOD

WaterFOG Equipment



Type SG-48 WaterFOG Nozzle. Easy to handle. Discharges high or low velocity WaterFOG or straight water stream.



Lightweight Rotating Cellar and Attic Pipe. Fights fires in cellars, attics, under piers, bridges, etc.

Type N22 WaterFOG Nozzle. Discharges high velocity WaterFOG. For general use around live electrical equipment.

Type N23 WaterFOG Nozzle with Swivel Handles. Discharges high velocity WaterFOG with higher discharge and greater range than Type N22 Nozzle.

ROCKWOOD SPRINKLER COMPANY

Engineers Water . . . to Cut Fire Losses

PORTABLE FIRE PROTECTION DIVISION

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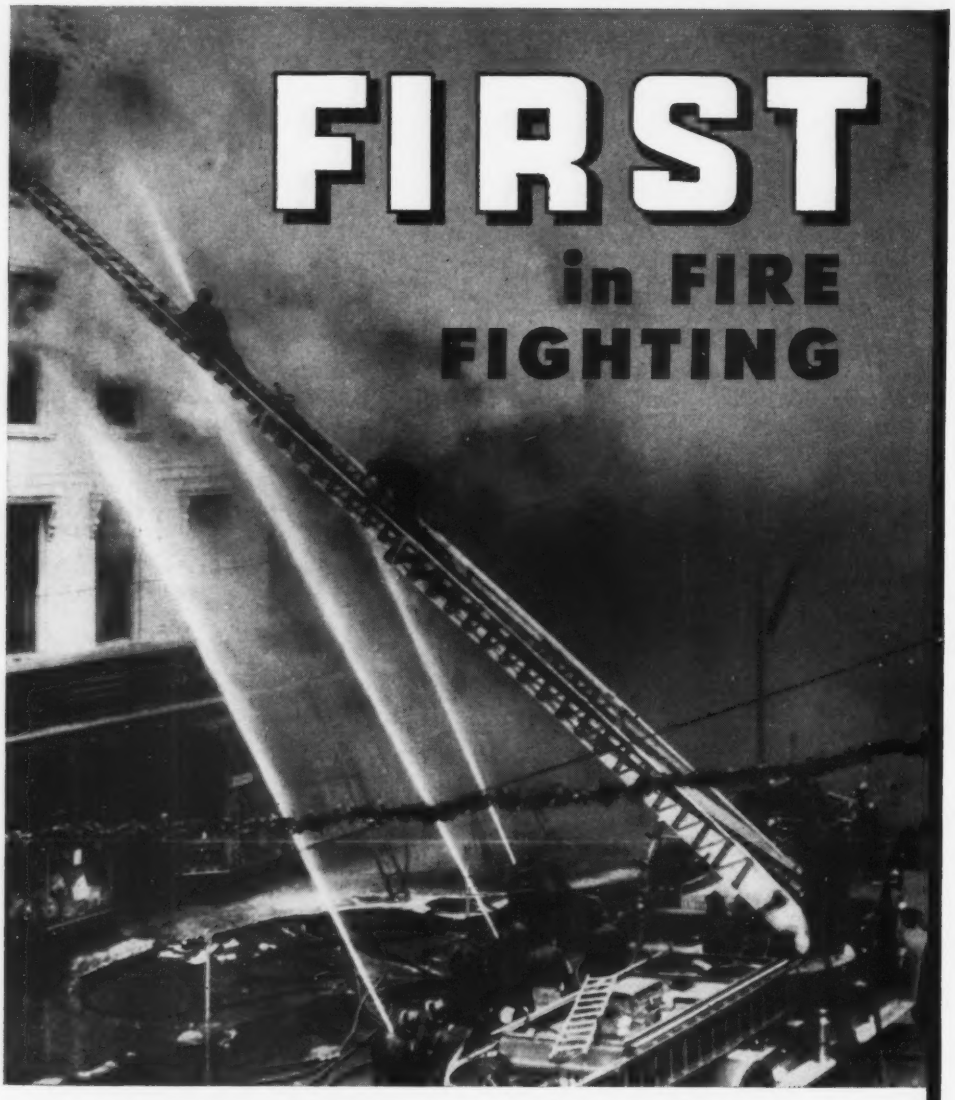
Distributors in all principal cities



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GENERAL FIRE TRUCK CORP.

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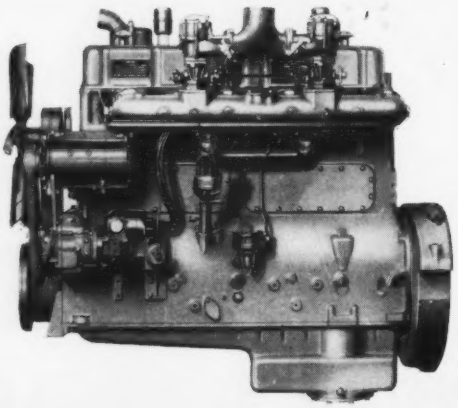
Model 145-GZB—270 hp range High-Output Fire Fighter— Six cylinders, 5⅜-in. bore x 6-in. stroke, 817 cu. in. displ., with counterbalanced and vibration dampened 3½-in. 7-bearing crankshaft; dual downdraft carburetion; dual ignition; precision extra high capacity bearings; removable wet type cylinder sleeves, aluminum pistons, overhead valves with Stellite-faced exhaust valves and seats. Arranged for full electrical equipment and all modern accessories. Get Bulletin 1662.



352 *Waukesha Motor Company, Waukesha, Wis., New York, Tulsa, Los Angeles*

WAUKESHA *FIRE FIGHTER* ENGINES

INSPIRATIONS FOR LEADERSHIP

MASTERFULLY MAGNIFICENT
IN BEAUTY AND PERFORMANCE

With the spectacular beauties shown above, Miller-Meteor advances into the future era of ambulance design! Never before has beauty-plus-performance been so dramatically expressed. Pictures can but slightly convey the superb craftsmanship of these masterful creations!

Miller-Meteor brings you the world's widest selection of fine ambulances—21 different models—three different headroom heights—all with the incomparable chassis by Cadillac. Unquestionably safe construction, matchless dependability, unparalleled efficiency, to fill every need. Four-litter emergency ambulances meet all requirements of rescue squads, fire and police departments. A spectacular M-M ambulance says so much about the business, group, or community that owns it.

For full information, contact your M-M distributor now, or write to:

MILLER-METEOR MOTOR CAR DIVISION • BELLEFONTAINE, OHIO
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For The Best in Protection — Specify Mars

NEW! MARS LIGHT

For Fire Departments Exclusively!

Model 888

An effective signalling or warning by a fire apparatus is becoming increasingly difficult because of the large number of multi-colored and moving lights encountered in the usual commercial street of a city. At the same time it is extremely important that quick recognition of fire apparatus be made and the streets properly cleared so that it can proceed without delay to its destination.

This powerful White Light commands the instant attention of vehicles moving ahead of the apparatus. Due to the rapid movement of the light, it does not blind oncoming drivers. Observers in front of the apparatus quickly respond to the warning light, as well as all cross traffic approaching intersections.

The Model 888 White Light has been adopted as standard equipment by the Chicago Fire Department.

This light is for *Fire Departments Exclusively,* and will not be sold other than to Fire Departments.

See Light in Operation

Booth # 7

New Orleans Conference

U. S. Patent #2456287

IMMEDIATE DELIVERY

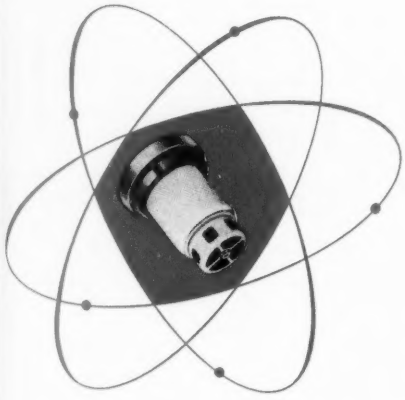
FIVE YEAR GUARANTEE

MARS SIGNAL LIGHT CO.
4322 W. Chicago Ave.

CHICAGO 51, ILLINOIS
BElmont 5-1811

Nuclear energy takes over the fire watch...

"Give us those FIVE PRECIOUS MINUTES!"



PYR-A-LARM A few brief minutes and a microscopic spark can ignite fresh fuel and become a dangerous, destructive fire. Fire officers know this but are powerless to act until the alarm is given.

Nuclear research now provides the solution to saving those vital minutes. PYR-A-LARM, the nuclear energized pre-detection system reacts to the invisible products of combustion—signals the alarm long before conventional thermal devices can function.

Each PYR-A-LARM detector head contains an outer detecting chamber, an inner reference chamber and a cold cathode tube. The air in both chambers is made conductive by special radio-active foils. Combustion products entering the outer chamber upset the electrical balance between the two chambers, triggering the cold cathode tube. The tube relays the signal to control cabinets which actuate audible and visible alarms, release extinguisher systems, shut down equipment, and perform other functions. *Approved by Underwriters Laboratories Inc. and Factory Mutual Laboratories.*

PyroTronics
A DIVISION OF SARGENT INDUSTRIES, INC.

AMONG ORGANIZATIONS WHICH RELY ON PYR-A-LARM PROTECTION ARE:

Douglas Aircraft Co.
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PYROTRONICS, Post Office Box 390, Newark, N. J. FE 8-57

☐ Kindly send literature describing PYR-A-LARM.

☐ Please contact me to arrange a demonstration in my office.

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NAME OF PLANT.....

ADDRESS.....

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The Scientific Approach f

. . . choose from the complete line of J

HPV . . . high pressure fog and volume
with the double power of 2 great pumps

Two proven methods — high pressure fog tha cools, smothers and isolates flames, plus Under writers' approved volume streams — give yo an unbeatable combination. The John Bea High-Pressure Fog pump delivers 60 GPM a 850 PSI pump pressure — and the John Bea Class A centrifugal volume pump is availabl for 500, 600, or 750 GPM performance.

for that INSTANT PUNCH

John BEAN high-pressure fog apparatus

The instant punch of John Bean high pressure fog stops fires **before** they grow. Microscopic size fog particles provide maximum heat absorbing effect with **any** type fire. This scientific approach, with the original John Bean high pressure fog, extinguishes 95% of your fires faster — with little or no water damage. That's why so many fire departments select John Bean fire apparatus.

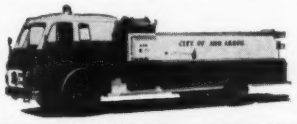
HPF . . . high pressure fog equipment that makes water go 10 times as far. Fighting fires on the run or stationary, there's no problem of water source. One gallon of water as high pressure fog has the fire killing capacity of ten or more gallons discharged in a conventional stream.

LITTLE BEAN . . . high pressure fog plus extra mobility for instant action

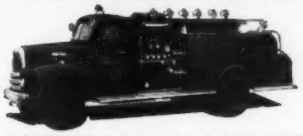
Built for speed, compactness and easy handling, the "Little Bean" high-pressure fog fire fighter is ideal for your "first out" unit — and as an all-around fire fighter for smaller and rural departments — for the fast knockout of forest, grass and brush fires — for airport and industrial plant protection.

MULTI-PURPOSE high pressure fog equipment

Apparatus shown at right is typical of special purpose units engineered by John Bean. These fire fighters are designed to accommodate all types of accessory tools and emergency equipment such as salvage and rescue equipment, forceable entry tools, ladders, light generators, flood lights, two-way radio, walkie-talkie, acetylene cutting torches, portable power saws and drills, first aid equipment, and regular fire department tools and appliances.



COMBINATION LADDER and RESCUE UNIT



COMBINATION SQUAD and RESCUE UNIT

John fmc **BEAN**

Lansing 4, Michigan San Jose 1, Calif.

ORIGINAL HIGH-PRESSURE FOG FIRE-FIGHTERS

Food Machinery and Chemical Corporation

SEND COUPON for details TODAY

John BEAN Division of Food Machinery and Chemical Corp.
Lansing 4, Michigan San Jose 1, California

Please send me literature on the following fire fighters:

☐ HPV — high pressure fog and volume ☐ HPF — high pressure fog
☐ Little Bean high pressure fog ☐ Multi-Purpose high pressure fog equipment

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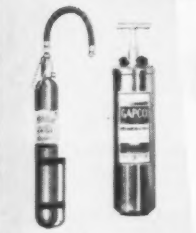
NOW! try the Best! . . .

New **GAPCO**

Pressurized

DRY CHEMICAL FIRE EXTINGUISHERS



Available in 5, 10, 20 and 30 lb. sizes. Pressurized with nitrogen to 350 lbs. P.S.I. in I.C.C. tested cylinders. Squeeze grip valve, which contains fusible safety plug, is extra large for perfect balance and safety. All models contain hose and horn. Pressure gauge indicates readiness — eliminates doubt.

EASY TO OPERATE and RECHARGE

Just pull the locking pin, aim horn, squeeze valve and the finest, most efficient dry chemical extinguisher goes into action. No bumping — no inverting — no cartridge to rupture. Recharging just as easy as discharging. Can be recharged on the premises where used.

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Mfrs. of Underwriters' and Factory Mutual Laboratories Approved Fire Extinguishers

At the scene, Preparedness pays in human lives and property saved

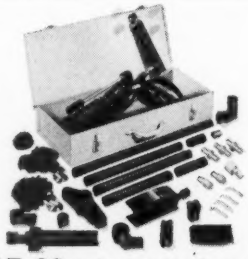
Equip all your vehicles with a proven BLACKHAWK hydraulic rescue set

Thousands of progressive fire, police, civil defense vehicles and industrial safety departments are equipped with Blackhawk "Porto-Power" hydraulic rescue kits. They have found these vital tools to be priceless aids in emergency situations where entrapped victims must be freed quickly, safely . . . where powerful Blackhawk remotely controlled hydraulic tools demonstrate mastery — pushing, pulling, bending, lifting, spreading, clamping, pressing.

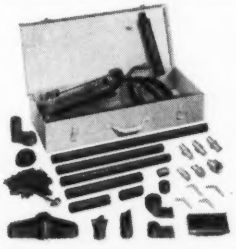
Development of this complete line of rescue sets is credited to these thoughtful and progressive safety experts. They urged and assisted Blackhawk to offer "Porto-Power" rescue kits to all public and industrial safety organizations.

Look over this "Porto-Power" rescue kit contents guide. Then, fill in and mail your order. Tomorrow may be too late!

When seconds are critical you need Porto-Power to force entry, free trapped victims



AZ-30 light duty kit, $141.00



AZ-31 special light duty kit, $99.75

FZ-28 general duty kit, $209.00

FZ-25 heavy duty kit, $374.00

Contents Guide

Standard Porto-Power Rescue Sets

NO.	DESCRIPTION	AZ-30	AZ-31	FZ-28	FZ-25
AZ-1002	3″ Lock-on ext.	1	1		
AZ-1003	5″ Lock-on ext.	1	1		
AZ-1004	10″ Lock-on ext.	1	1		
AZ-1005	15″ Lock-on ext.	2	2		
AZ-1006	23″ Lock-on ext.	1	1		
AZ-1050	Lock-on connector	3	3		
AZ-1051	Male adaptor	2	2		
AZ-1052	Female adaptor	1	1		
AZ-1200	Flat base	1	1		
AZ-1308	Clamp head	1	1		
AZ-1650	Metal case	1	1		
AZ-1900	Lock pin	4	4		
FZ-1002	5″ Lock-on ext.			1	1
FZ-1003	10″ Lock-on ext.			1	1
FZ-1004	20″ Lock-on ext.			2	2
FZ-1005	30″ Lock-on ext.			1	1
FZ-1050	Lock-on connector			3	3
FZ-1051	Male adaptor			2	5
FZ-1052	Female adaptor			1	1
RC-251	10-T Ram with ZR-400 female half-coupler				1
S-73	10-T Hydraulic unit			1	1
SA-4	Wedgie with ZR-400 female-half SPEE-D coupler			1	
SA-6	Wedgie ram	1			
SA-7	Spred ram				1
SA-50	P-400 Pump, RC-540 ram and Z-864 hose assem.	1	1		
Z-5	Chain pull plate			2	2
Z-8	Clamp end toe			1	1
Z-9	Plunger toe			1	1
Z-10	Short connector			1	1
Z-14	Flat base			1	1
Z-16	90° "V" base			1	2
Z-21	Lock pin			8	8
Z-30	Ram toe			1	1
Z-34	Serrated saddle			1	1
Z-128	3¼″ Flex-head			1	1
Z-129	Wedge head			1	1
Z-131	5″ Flex-head			1	1
Z-132	Chain pull plate			1	1
Z-141	7′ chain, hook			2	2
Z-192	Clamp head			1	1
Z-285	Slip-lock ext.			1	1
Z-436	Serrated saddle				1
Z-530	Plunger toe	1	1		
Z-531	Serrated saddle	1	1		
Z-532	90° "V" base	1	1		
Z-539	2¼″ Flex-head	1	1		
Z-545	Short connector	1	1		
Z-557	5′ Chain, hook	2	1		
Z-558	Chain pull plate	1	1		
Z-595	Lifting toe				1
Z-607	Plunger base				1
Z-629	Wedge head	1	1		
Z-650	Slip-lock ext.	1			
Z-668	Z-914 6′ hose, SPEE-D coupler. FZ-1614 ⅜″ coup. assem.				1
Z-1034	Ram toe	1	1		
19523	Wood case				1
19811	Wood case			1	
LX-21	Qt. hydraulic oil				1
ZR-400	Female ½″ SPEE-D coupler				1

"Porto-Power" Rescue Kits — THE HYDRAULIC TOOLS ORIGINALLY SELECTED, TESTED AND USED BY THOUSANDS OF MUNICIPAL FIRE AND SAFETY OFFICIALS!

Fill out and mail your order today!

Gentlemen: Rush me your complete Blackhawk "Porto-Power"

- ☐ Rescue Equipment Catalog HR-300.
- ☐ AZ-30 light duty kit. Price, $141.00*
- ☐ AZ-31 special light duty kit. Price, $99.75
- ☐ FZ-28 general duty kit. Price, 209.00
- ☐ FZ-25 heavy duty kit. Price, $374.00
- ☐ Please have your representative call.

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**Prices subject to change without notice. Price includes cost of shipping and handling anywhere in the U.S.A.*

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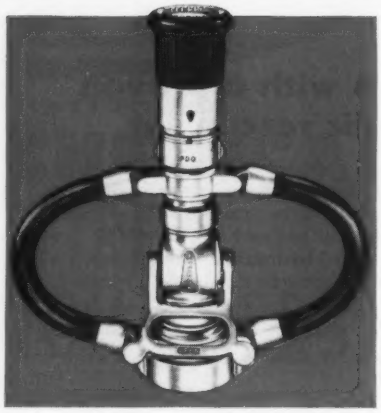
BLACKHAWK MFG. CO., DEPT. P-6487, Milwaukee, Wisconsin

"World's largest manufacturer of hydraulic power tools"

For dependable fire fighting...

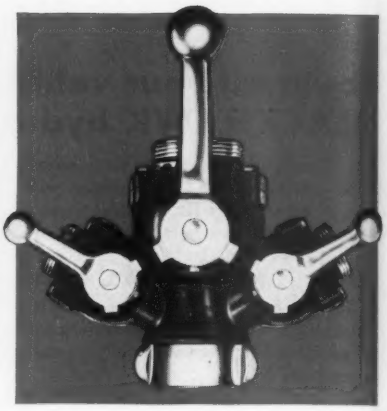
3-INLET MULTIVERSAL

Gear operated, hand wheel control. Safety stop and lock permits portable operation down to 25° and "mounted" operation to 15° below horizontal. Lightest deluge set in the service. Will not creep or crawl. Style #501-MT.



AXIAL PLAYPIPE WITH PDQ-X NOZZLE

Revolutionary new design. Shutoff between Playpipe handles. Shorter, more compact, and better balanced. Large gallonage — equivalent to 1" tip. Removable tip simplifies addition of 1½" lines for overhaul and clean-up. Style #1233.



WATER THIEF

Short, light, compact. Use with preconnected lines, on a hydrant, on discharge gate of pumper, etc. Permits addition of 1½" lines, or removal of 2½" without shutting down. Quarter turn valves with adjustable seat. Style #273.

"HY-DRAIN" HYDRANT PUMP

A fast, durable, positive displacement, double action, piston pump capable of emptying the average hydrant in less than a minute. Self-priming, Universal base with wing nut permits attachment to any square or pentagon hydrant nut.

Style #525B.

HEAVY DUTY ROCKER RING® COUPLING

Heavy duty, drop-forged, "Rocker Ring" coupling. The toughest, strongest made. Available in 1½" and 2½". Higbee thread and Higbee indicators. Style #92.

PDQ-X FOG NOZZLE

The top of the PDQ. No ball shutoff. Same rugged, all cast brass construction — no tubing. Molded rubber bumper. Positive stream selection, by feel or sight. Nozzle has its own shutoff. Available in 1½" and 2½" sizes.

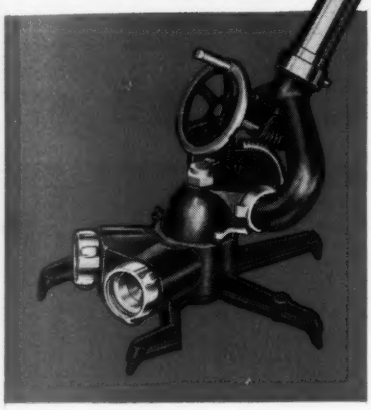
SEE YOU IN NEW ORLEANS!

Booth No. 98, I. A. F. C. Convention

complete display of Akron Brass fire equipment

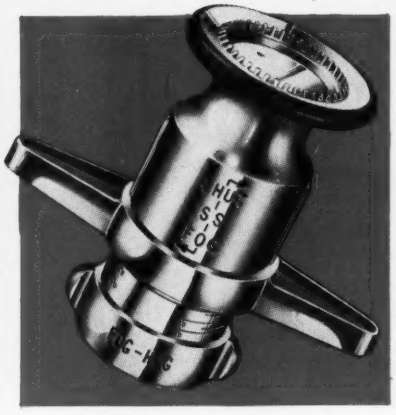
Specify AKRON

"AMERICA'S BEST FIRE EQUIPMENT"



TWO INLET MULTIVERSAL

Light weight — 55 lbs. Handwheel adjustment. Perfectly balanced. Relieves manpower for other duties. Low friction loss. Akron stream shapers for non-feathering stream. Can be used with FOG-HOG for complete versatility. Style #491.



"FOG-HOG" NOZZLE

DELUGE

With all-round indicator for preselection of stream. Tremendous gallonage and projection. Use on ladder pipes, deluge guns, deck pipes. All degrees of fog, straight stream or shut-off instantly available. Bind-free operation at all pressures. ROCKER LUG—available in 500, 700, 1000, 1350 and 2500 G.P.M. sizes.

"P.D.Q." NOZZLE

HOSE LINE

Adjustable through all angles of solid fog and straight stream. Akron quality ball shut-off. Guaranteed gallonage. Positive stream positioning indicators. Swiveling "ROCKER LUG" base — handle is always up. Corrugated no-slip grip. 1", 1½" and 2½" sizes.

"FORGEX" COUPLINGS

Drop-forged for strength. Light weight — perfect companion for light weight hose. "ROCKER LUG" — Higbee Indicators. Tapered hose bowl — stays on hose under all pressures. Unconditionally guaranteed to give complete satisfaction. Style #88

SIAMESE

Two and one-half inch FULL FLOW Ball-Valve Siamese. One 2½" female inlet . . . two 1½" male outlets. Solid red brass casting. Operating pressures to 500 lbs. The industry's best made and most widely used Siamese. Style #481.

UNIVERSAL THREAD ADAPTER

Instantaneous connection to all thread sizes. Your own thread on male end. Moveable bronze jaws provide adjustable female. Push handles together and watertight connection is made. Light weight — 7 lbs. No wrenches needed. Style #575.

SPANNER WRENCH HOLDER

Wrenches ready for immediate use. Complete with two No. 10 spanner wrenches. Wrenches always in place, one hand operation. Style #448.

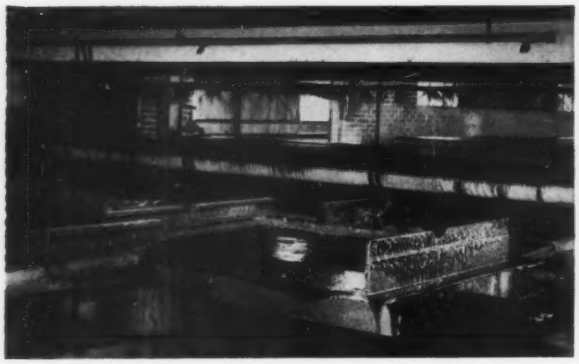
AKRON BRASS

FIRE FIGHTING EQUIPMENT

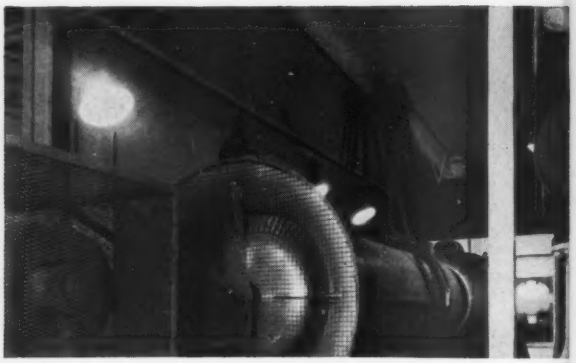
AKRON BRASS MANUFACTURING CO., INC.
WOOSTER, OHIO

Special Hazards call for *Special Protection against*

YOU can't be expected to know *all* the answers about every type of fire hazard. But Grinnell, with 87 years' experience protecting against fire hazards of every description, has thorough background knowledge upon which you can draw. Let a Grinnell Fire Protection Engineer recommend the best system under every circumstance. Write Grinnell Company, Inc., 287 West Exchange St., Providence, R. I.



WATER SPRAY Asphalt coating machine at Alabama Pipe Company, Anniston, Ala., has a Grinnell ProtectoSpray System.



AIR FOAM Engine test cell at Trans World Airlines, Inc., Kansas City, Mo., is protected by a Grinnell ProtectoFoam System.

DRY CHEMICAL Hot oil dip tanks at Royal Canadian Air Force Supply Depot, Namao, Alta., has a Grinnell dry chemical installation.

CARBON DIOXIDE Record storage vault at West Penn Power Company, Greensburg, Pa., uses a Grinnell carbon dioxide installation.

GRINNELL

Manufacturing, Engineering, and Installation of Fire Protection Systems Since 1870

There's a GRINNELL Fire Protection System for every fire hazard

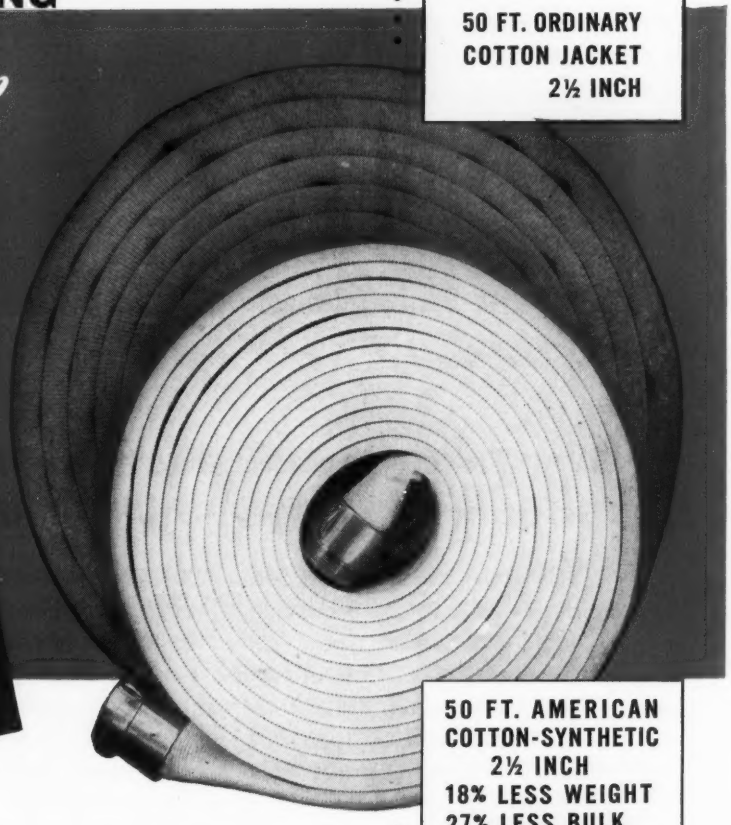
- Automatic spray sprinklers — wet pipe, dry pipe, and Simplex systems
- Spray sprinklers with rate-of-rise detection — Multitrol deluge or dry pipe systems
- Emulsion and vapor dilution extinguishment — Mulsifyre and ProtectoSpray systems
- Water spray for cooling, insulation, and controlled burning — ProtectoSpray systems
- Air foam blanket — ProtectoFoam systems
- Carbon dioxide blanket — C-O-Two systems
- Dry chemical systems

A GREAT HOSE PROVED BY YEARS OF FIELD TESTING

THE *American*

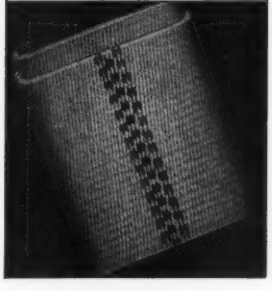
COTTON-SYNTHETIC JACKET *Hose*

400 AND 600 LB. TEST



50 FT. ORDINARY COTTON JACKET 2½ INCH

50 FT. AMERICAN COTTON-SYNTHETIC 2½ INCH
18% LESS WEIGHT
27% LESS BULK
50% STRONGER



Try this great new hose. See for yourself how its long-lived cotton-synthetic jacket and laminated natural rubber lining make for easy handling, while saving space and weight. Here's the story —

EASIER TO HANDLE—50′ of this AMERICAN Cotton-Synthetic Hose weighs 18% less than 50′ of average cotton jacket hose . . . enables firemen to move more hose faster. Also lies flatter, coils better, stays flexible wet or dry.

SAVES SPACE—AMERICAN Cotton-Synthetic enables you to carry at least 25% more hose.

STRONGER—High strength-to-weight ratio remains same wet or dry . . . tests prove it 50% stronger than regular hose.

Why lug heavy, bulky, hard-to-handle hose?
Order AMERICAN Cotton-Synthetic Jacket Hose—available in 400 and 600-lb. test—from your dealer NOW. . . or write us for details.

THE *American* RUBBER MANUFACTURING CO.

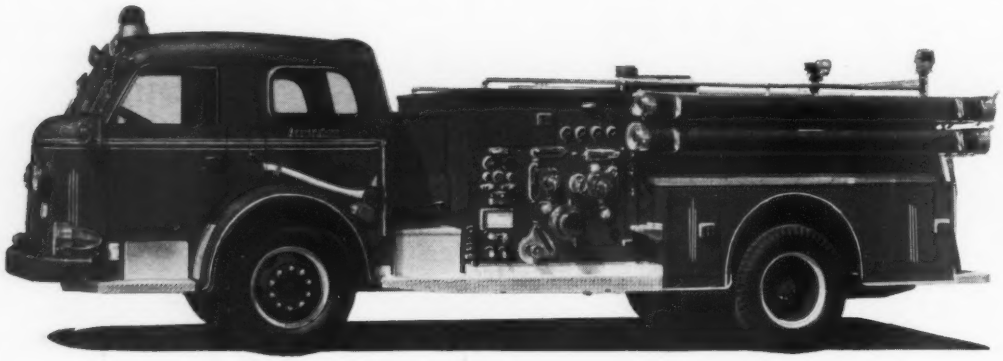
AR-26

MAKE SURE; Look for Identifying Stripe and Test Report

AMERICAN Cotton-Synthetic Jacket Hose has red, white, and blue identifying stripe. Each 50′ length is factory proof tested with couplings on, for strength, stretch, and twist. Test report accompanies hose.

Factory & General Offices: • 1145 Park Avenue • Oakland 8, California • Phone OLympic 2-0800

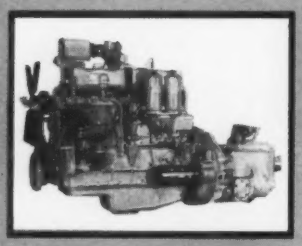
These features make AMERICAN LaFRANCE



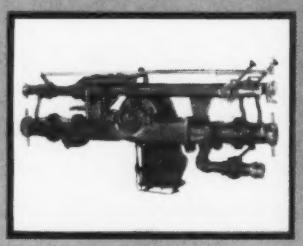
● Spartan, 1000 g.p.m., Class A Triple Combination Pumper.

Over Twenty Special Features Insure Outstanding Performance, Safety, Utility and Reliability

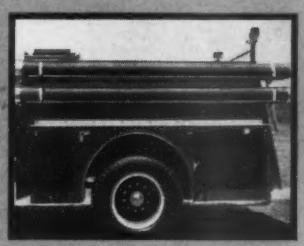
The American LaFrance Series 800 Deluxe fire engines are built to continue our reputation for producing "The World's Finest Fire Engines." Every feature to provide you a better fire engine is engineered into the design of the Series 800. The driver has a maximum of visibility, with easy steering and short turning radius in the cab-ahead-of-engine design. And safety, too, is a service-proved feature. The *Twin Flow* pump with bronze housing has six special features for producing more gallons of water and longer service life.



Seven different engines afford a wide range of power selection (175 b.h.p. to 330 b.h.p.) to give you top road and pump performance. These engines have proved their stamina and reliability in the fire service.



The TWINFLOW pump is parallel-series 2-stage, centrifugal. It is produced in all N.B.F.U. and I. A. F. C. capacity ratings for Class A performance. Also, for pressures to 600 p.s.i. Pump controls for left or right side operation are optional.



Nine equipment compartments are provided. Seven are enclosed, waterproof type with lights in the compartments. The side compartments shown above are of ample size for gas masks, resuscitators or inhalators.

● *Write today for the new brochure illustrating and describing these important features.*

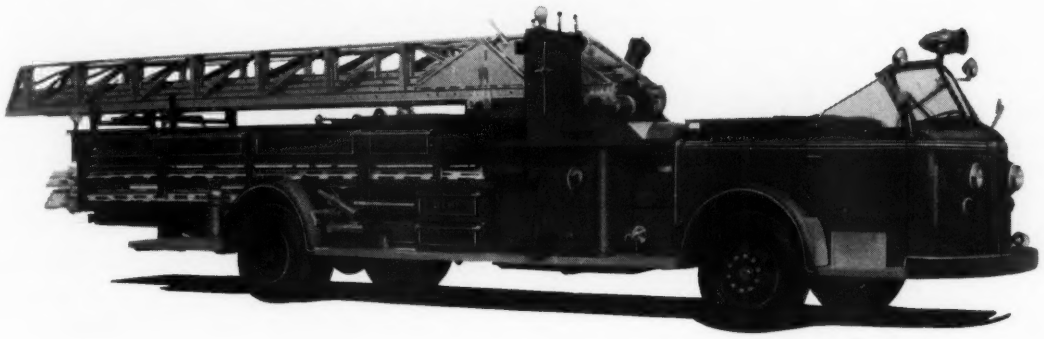
AMERICAN LaFRANCE CORPORATION

ELMIRA, NEW YORK, U. S. A.

LaFRANCE FIRE ENGINE AND FOAMITE LIMITED

TORONTO, 9, ONTARIO, CANADA

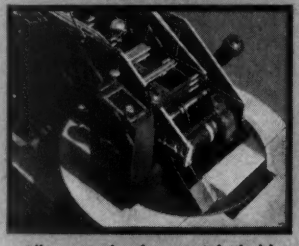
"Series 800" Deluxe your best fire engine buy



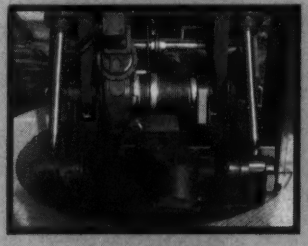
● Model 4-100 Aerial Ladder Truck

Eighteen Special Features Combine to Provide a Maximum of Safety and Maneuverability

Today's fire fighting operations require a maximum of strength and stability with a sensitive, accurate control. The all-steel aerial ladder with all welded construction provides a maximum of strength and stability for rescue, water tower and fire service operation. The large 65 inch turntable which supports the ladder and the wide spread positive operating jacks provide unequalled operating stability. One man controls all operation of the aerial ladder by hydraulic power with all controls directional. For safety and dependability all piping is heavy copper tubing — no synthetic rubber hose.



All controls for aerial ladder operation are housed in a weather proof pedestal. Three visual indicators are provided to automatically register the maximum recommended load at any angle and extension. Note the clear access to the ladder — an important safety feature.



The clean design under the ladder with access to the controls is shown above. Note the freedom from external piping, eliminating possible damage. Drilled passages are an added safety feature.

The wide spread ground jacks, 145 inches center to center across the chassis, provide a maximum of aerial ladder stability. They are positive when set and yet in an emergency the truck can be moved without retracting the jacks.

Our aerial truck brochure illustrates these and other important features - write for your copy today!

See the new Series 800 Deluxe pumpers and the 100-ft aerial ladder on display at the auditorium in New Orleans, September 9-15, during the I.A.F.C. Conference.

General Electric announces

New transistorized power supply for two-way radio

General Electric now brings you the vastly improved reliability of transistors — *without obsoleting your present equipment!*

The all-new General Electric Transistorized Power Supply—part of G.E.'s advanced Progress Line—replaces the receiver portion of the mobile power supply and eliminates the receiver vibrator.

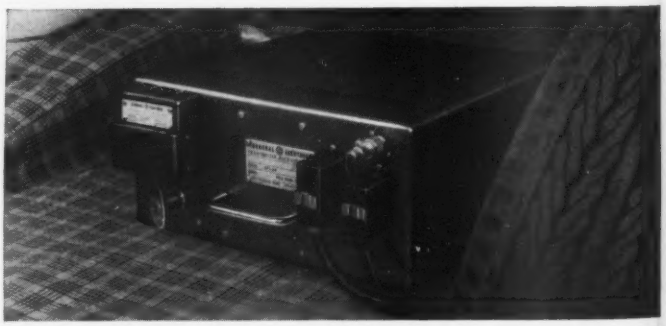
Here's what this means: Previously you had to replace receiver vibrators several times a year. Our surveys indicate each replacement costs you from $10 to $18, depending upon service call mileage. Now you can install a power supply costing only $54.50 (when installed in new equipment at the factory, just $44.50) which has the same life expectancy as your entire mobile combination. *The new G-E Transistorized Power Supply will easily pay for itself the first year or two on vibrator replacements and service calls!*

Easy to install—Three mounting studs fasten the new unit to the front of your case or inside the older, two-unit design equipment. Electrical connections are simple: only four leads to attach.

Eliminates "Vibrator Hash" — All traces of the "vibrator hash" which interferes with clear reception are gone for good.

Easily added to any 12-volt system — The new power supply can be used with all standard makes of two-way equipment which operate from an ordinary 12-volt power source.

Saves you money when drivers forget—When drivers neglect to turn off their radios before starting a vehicle, the new transistorized power supply cannot be damaged.



Progress without obsolescence — The addition of the new unit to your present mobiles, no matter what make, improves performance, reduces maintenance cost, and adds to the life of your equipment. *There is absolutely no need to buy complete new mobile units to enjoy the advantages of transistors.*

2-WAY MOBILE RADIO

See for yourself how much you save—buy a new unit or several units and try them in your own 12-volt mobile units. Call your G-E communications consultant, listed under "Radio Communication Equipment" in the Yellow Pages. Or order direct by writing General Electric Co., Communication Products Dept., Syracuse, N. Y.

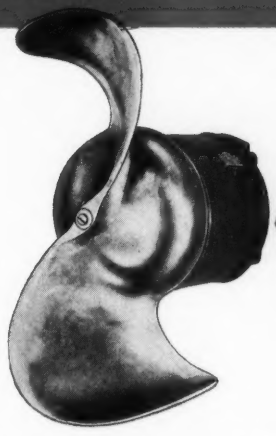
Progress Is Our Most Important Product

GENERAL ELECTRIC

Super Vacuum ..... THE ANSWER TO YOUR SMOKE EJECTION PROBLEMS

● REVOLUTIONARY NEW PRINCIPLE INCREASES FIRE FIGHTING EFFICIENCY!

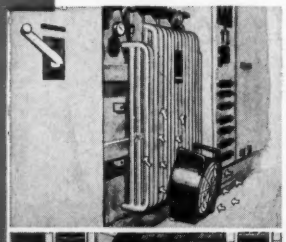
● The Super Vacuum Smoke ejector is a powerful portable fan unit designed especially for fire departments. This design is a new and revolutionary principle in moving air. Several thousand Super Vacuum Smoke ejectors are in use throughout the United States and Canada. Controlled ventilation is new and very necessary in fire fighting. Years of service and satisfied users are your best guarantee for any merchandise.



THE HEART OF THE SUPER VACUUM

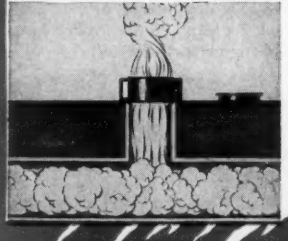
● The secret of Super Vacuum is the patented fan blade. Conventional fans chop the air and push it back. Whereas the Super Vacuum fan blade is a perfect spiral air screw which creates a partial vacuum, suction is created over the entire face of the blade and the air or smoke is discharged in a high velocity spiral. There are no dead spots—that is why Super Vacuum outperforms other fans twice its size.

TYPICAL USES

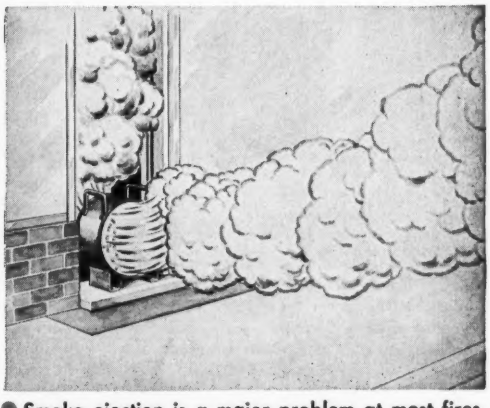


● Super Vacuum ejectors are often used by fire departments in emergencies to cool generators, pumps and motors. The strong discharge of air quickly reduces the temperature to a safe level.

● Fresh air can be forced into a building with or without a deodorant. By applying deodorant to a pad and attaching it to the intake face of the Super Vacuum fan, air is pulled through this pad and forced throughout the building. Smoke odors are dissipated and soot is settled.



● Poisonous or explosive gases can be effectively removed from sewers, basements, tunnels and mine shafts with the Super Vacuum Fans. They can be used in any position horizontal or vertical.



● Smoke ejection is a major problem at most fires. Super Vacuum does it faster, cheaper and more efficiently than any similar device on the market. As a Nationally known Fire Chief said recently, "Smoke ejectors are as necessary as fire hose in fighting fires."

Write for Additional Information or Contact Your Local Fire Equipment Dealer

MANUFACTURED EXCLUSIVELY BY

Super Vacuum MANUFACTURING CO., INC.

319½ East 17th Avenue • Denver 3, Colorado

Most productive V-8 horsepower

One of 9 reasons why firemen find International Fire Truck Chassis cost least to own!

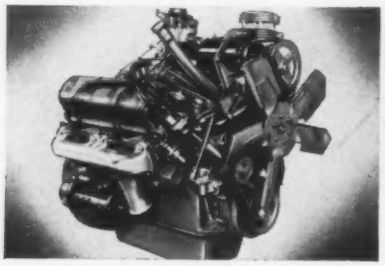
Nowhere else can you get so much usable power for so low a cost! Up to 257 hp!

Not only is this superior power and performance the best value, but so is the complete INTERNATIONAL Fire Truck chassis. Why? Because of one INTERNATIONAL policy to use the finest parts, features and components—to spend more to build the truck so it keeps operating costs at rock bottom. And cost record figures prove* that over the years, INTERNATIONALS cost *least* to own.

Why not have a truck expert explain all the details? He's a reliable businessman, your INTERNATIONAL Truck Dealer.

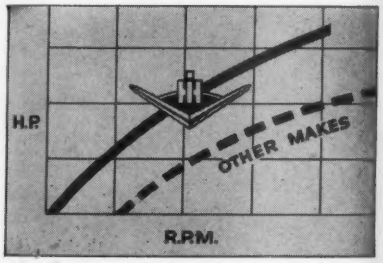
**Signed statements in our files, from fleet operators throughout the U.S., back up this statement.*

INTERNATIONAL HARVESTER COMPANY, CHICAGO
Motor Trucks • Crawler Tractors
Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

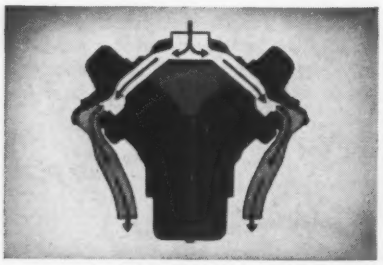


1 Most productive V-8 horsepower . . . up to 257 hp. Nowhere else can you get this much usable power for so low a cost. You get the agile performance you demand at low engine rpm along with minimum expense . . . the perfect combination.

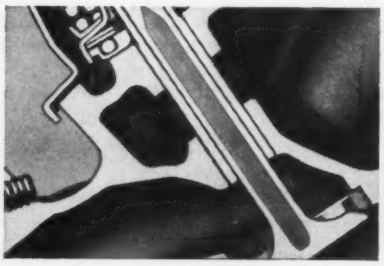
2 V-8 power to match every need. Choice of 206, 226, and 257 hp. Quick starts, faster acceleration and responsive power for every emergency driving condition—hills, corners and straightaways. Bonus pumping capacities, too.



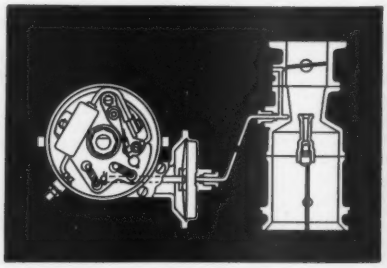
3 Truly low friction design is the result of both short stroke (less piston travel) and low engine rpm. New INTERNATIONAL V-8's are designed for *both* to give greater fuel economy, lower maintenance costs and better performance.



4 Improved performance and greater efficiency are achieved by the new INTERNATIONAL V-8 free-breathing design. Less restriction in passages provides for proper air-fuel mixture that increases volumetric efficiency to a high *92%*.

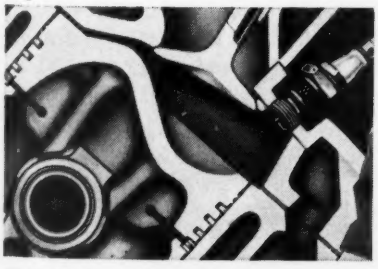


5 World's most modern V-8's have exclusive "wet" replaceable exhaust valve guides, positive rotating valves, hydraulic tappets, exhaust valve faces and seats of heat-resistant stellite to cut servicing costs and increase dependability.

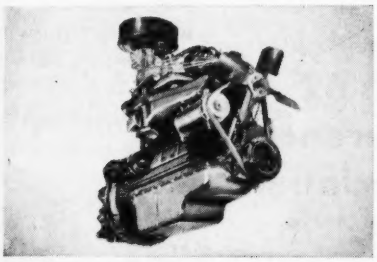


6 Distributor is fully vacuum controlled and sealed for top performance, dependability, and economy. New, high-capacity 12-volt ignition system has positive engagement starter and special "hot spark" circuit for quicker, surer starts.

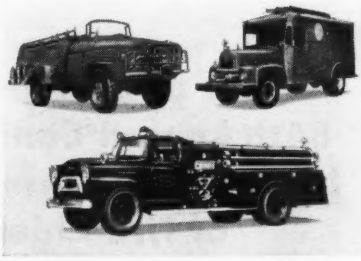
One of four new V-Line fire truck chassis with up to 257 hp. There are eight other specialized INTERNATIONAL models, too. Every one available with the components and power to match your specifications. If you want the best in fire truck chassis, the one that costs *least* to own, over the years, you want an INTERNATIONAL.



7 Fully machined combustion chambers prevent power-robbing carbon deposits. Peak performance is maintained longer. Service costs are kept at rock bottom. You get maximum power and economy with regular grade gasoline.

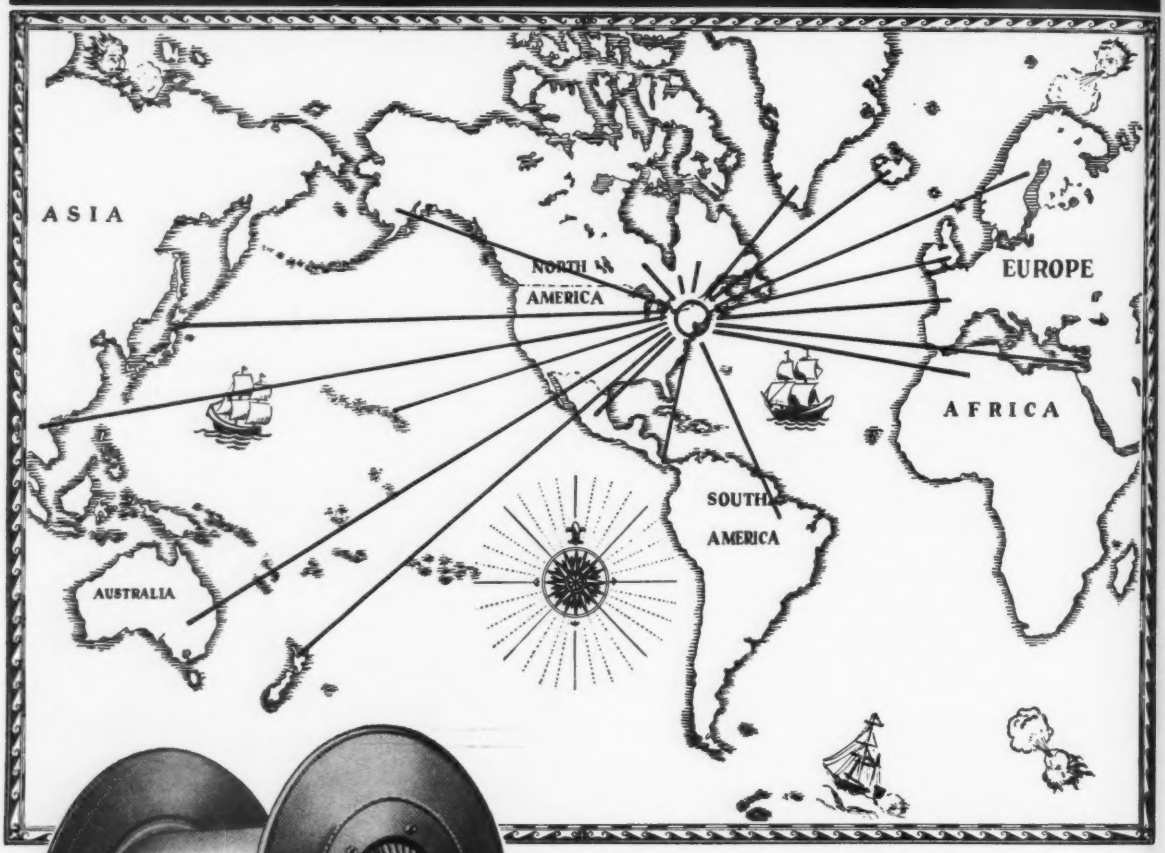


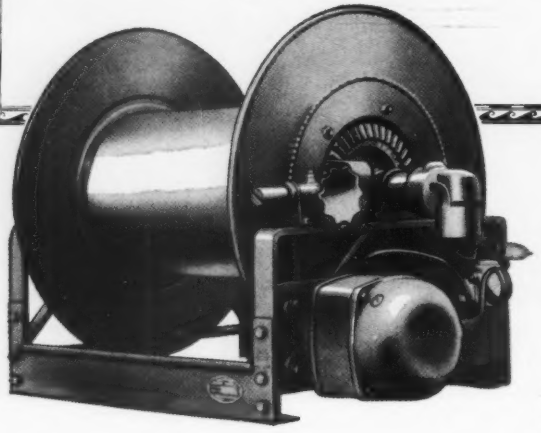
8 The performance you need and want with eleven engines, including eight famous sixes, up to 212 hp. Models available with three and four different power plants. INTERNATIONAL-built for top performance, long dependability at least cost.



9 In the world's most complete line, there are also eleven all-wheel-drive models. Ideal for fighting fires where the going is rough and tough. Specialized chassis for rescue units, too. Name it, there's an INTERNATIONAL just right for you.

HANNAY...Greatest Name in HOSE REELS!





Designed by Firemen FOR Firemen!

Made by the leading manufacturer of hose reels for all types of service, and acclaimed by users as "the most dependable, efficient Hose Reel ever built."

Always ready *at the nozzle* for INSTANT USE, whether all or only a few feet of hose is unreeled. Hub assembly provides full, uninterrupted flow. Ball bearing swing joint gives long, trouble-free service . . . does not carry the weight of the reel. There is a HANNAY Hose Reel to meet your specific requirements.

Visit us at Booth 62
84th Annual Conference
International Association
of Fire Chiefs,
New Orleans, La.

Sustaining Member

HANNAY
REG. U.S. PAT. OFF.
HOSE REELS
CLIFFORD B. HANNAY & SON, INC.
WESTERLO, NEW YORK

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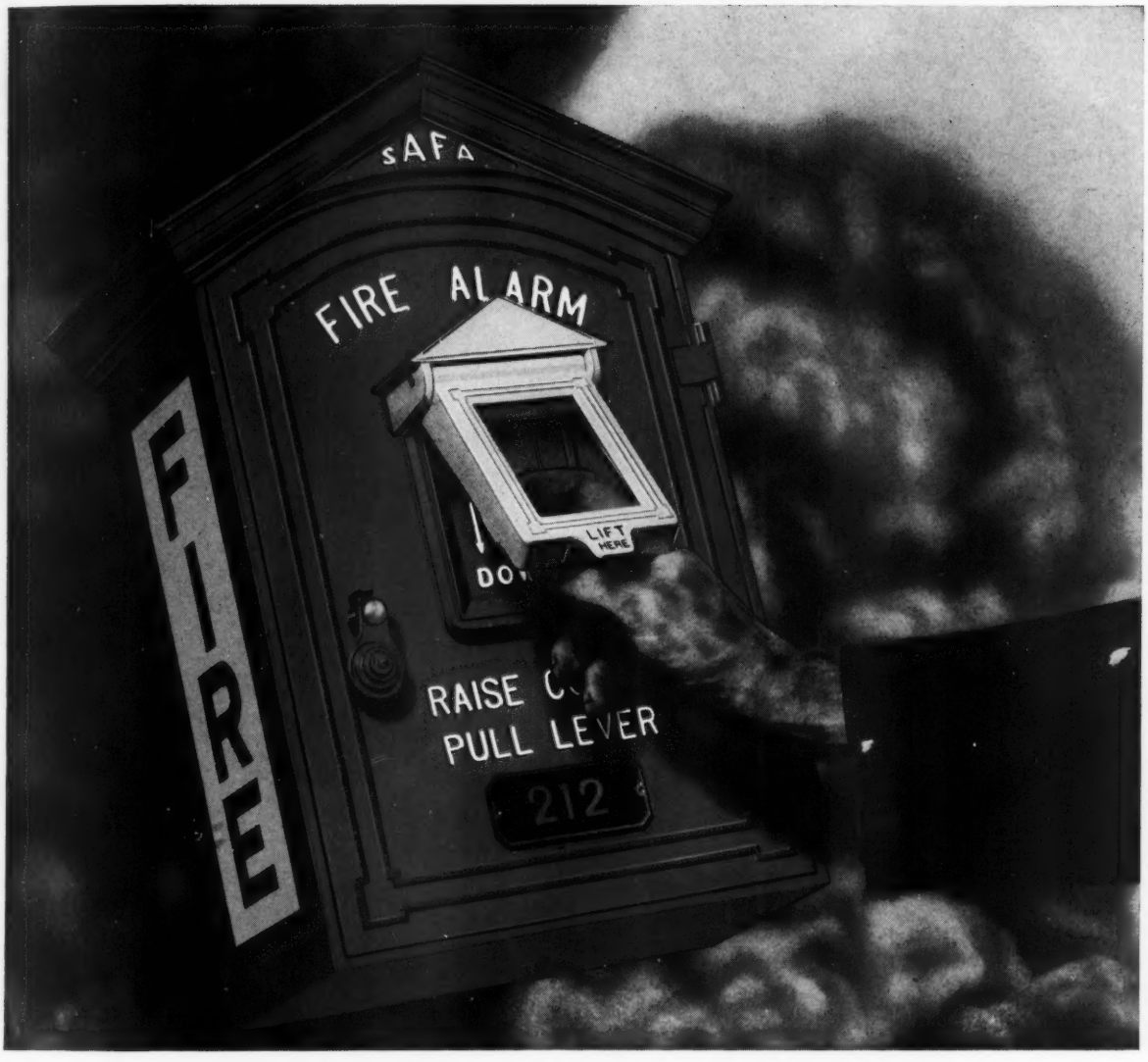
MANUAL AND POWER OPERATED HOSE REELS FOR EVERY PURPOSE



CAUSE FOR ALARM

Dependable SAFA Alarm Systems Help Save Lives, Reduce Property Losses in over 100 Municipalities

A sleeve singed by flame, a hand stained with ashes, frantic fingers reaching for a lever – all these are *cause for alarm.*

ONE HAND OPERATION – With dependable **SAFA** signal systems, the cause-for-alarm can be speedily eliminated. Simple one-hand, one-motion operation of box cover and lever means quicker alarms, greater saving of life and property. Gravity-closed, weather-proof lift cover discourages tampering, protects alarm lever under all conditions.

UNINTERRUPTED SIGNAL CODING–The slightest movement of alarm lever dispatches an uninterrupted signal series that cannot be willfully or accidentally distorted.

Be sure to specify **SAFA** for the highest quality, most dependable alarm systems–products of the Fyr-Fyter Company, manufacturers of fire protection equipment for more than 40 years.

Some of the more than 100 installations with dependable **SAFA** alarm systems:

Newark, N. J. • New London, Conn. • Tallahassee, Fla.
Augusta, Ga. • Louisville, Ky. • Augusta, Me. • Minneapolis, Minn.
New York, N. Y. • Sandusky, Ohio • Philadelphia, Pa.
Corpus Christi, Texas • Alexandria, Va. • Montreal, Canada

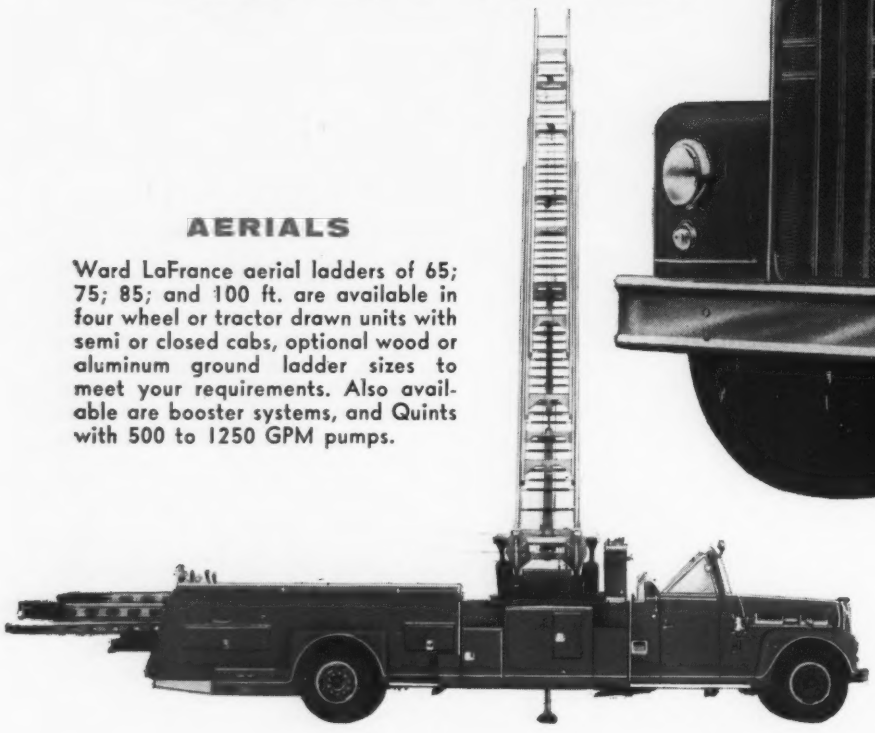
SAFA ALARM DIVISION *The Fyr-Fyter Co.*
NEWARK, NEW JERSEY

WARD LaFRANCE

FIRE APPARATUS

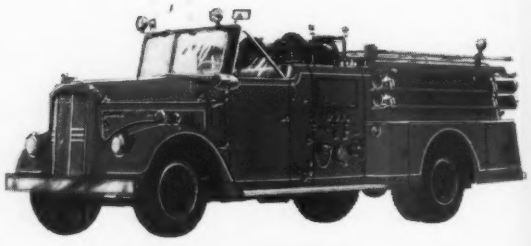
AERIALS

Ward LaFrance aerial ladders of 65; 75; 85; and 100 ft. are available in four wheel or tractor drawn units with semi or closed cabs, optional wood or aluminum ground ladder sizes to meet your requirements. Also available are booster systems, and Quints with 500 to 1250 GPM pumps.



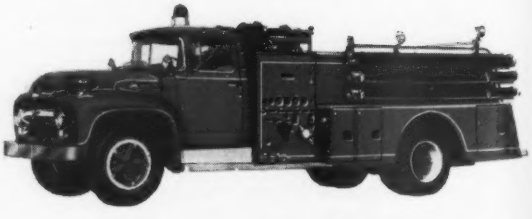
FIREBALL SPECIAL

Limited budget? Custom built rigs too high? The Ward LaFrance Fireball Special is your answer. Available with either 500 or 750 GPM pumps, and is designed to give smaller cities and volunteer companies a completely custom built apparatus. Also available with three stage high pressure pumps, open and closed cabs.



COMMERCIAL APPARATUS

Do you plan on having fire equipment mounted on a commercial truck chassis? If so, consider a Ward LaFrance engineered job. All of the features of our regular custom line regarding fire pumps, tanks, bodies, compartments, etc., can be incorporated on a commercial truck furnished by you. Just let us know your requirements.



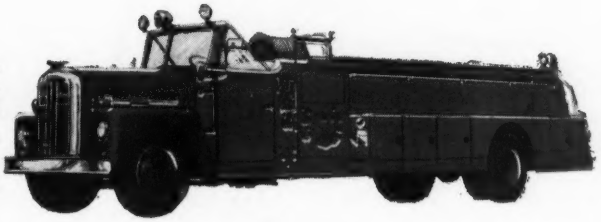
See us at the I.A.F.C. Conference in New Orleans, La. SEPT. 9, 10, 11 & 12. BOOTHS 91 AND 92.

PUMPERS

These are the foundation for any fire department. Ward LaFrance triple combination pumpers have two important features: (1) a rugged, dependable engine with an excess of torque and horsepower and (2) the most modern fire pump in the world. Fully automatic plus manual pump controls. Split housing design simplifies maintenance problems. Variations in tank sizes are available as well as a variety of cabs including 3-man semi-cab, 3-man closed cab, 7-man canopy cab or a 5-man sedan cab. Three stage high pressure pumps or high pressure booster pumps are optional extras available.

QUADRUPLES

The Ward LaFrance Quad offers four complete banks of ladders, booster tank and booster system, plus variations in engine and pump sizes from 500 to 1250 GPM. In addition ample hose body space is provided. Available in both running board and cabinet style bodies. Three stage high pressure pumps available as optional equipment.



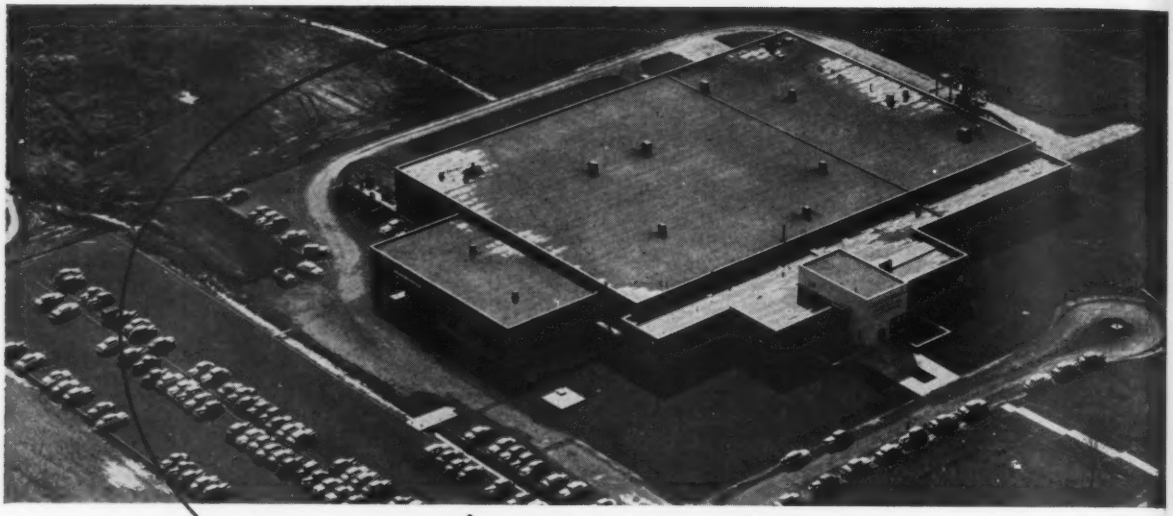
WARD LaFRANCE
TRUCK CORPORATION

GENERAL OFFICE & FACTORY: Grand Central Ave., Elmira, N.Y. Tel. 3-5631 DIRECT FACTORY BRANCH 139th St., & Bruckner Blvd., New York 54, N.Y. Tel CYpress 2-3300 EXPORT: Ward Lafrance International, Inc., Elmira, N.Y., U.S.A. Cable Address: "Wardtruck"

FIRE APPARATUS MANUFACTURERS FOR OVER 39 YEARS

THE SKINNER CHUCK COMPANY NEW BRITAIN, CONN.

and SKINNER ELECTRIC VALVE DIVISION



gets better protection . . .

SAVES $12,500 A YEAR

by protecting its property *Automatically* with **ADT**

- Sprinkler Supervisory and Waterflow Alarm Service
- Aero Automatic Fire Detection and Alarm Service
- Heating and Industrial Process Supervisory Service

We strive in every way to maintain uninterrupted production, and for that reason sought the best available safeguards for our plant. Experience with ADT Automatic Protection has proved that it is superior to hourly patrols in keeping us safe from fire and other hazards, though it is considerably less costly. Our savings are approximately $12,500 a year.

Paul K. Rogers, Jr.
PRESIDENT

Quality is an important factor in the manufacture of Skinner chucks and Skinner electric valves. The firm likewise demands quality in the protection of its plant . . . a primary consideration in their selection of ADT *Automatic* Protection Services for existing buildings and two new wings now under construction.

The satisfaction expressed by Mr. Rogers is typical of the comment of thousands of business executives who know that ADT *Automatic* Services give better protection for property, profits and employees' jobs, and at less expense.

May we show you what ADT can do for you?

Whether your premises are new or old, sprinklered or unsprinklered, there is an ADT Automatic Protection Service to detect dangerous conditions and to notify fire, police or other protective forces immediately and *automatically.*

An ADT specialist will be glad to show you how combinations of automatic services can safeguard your property. Call if we are listed in your phone book; or write to our Executive Office.

ADT

Controlled Companies of

AMERICAN DISTRICT TELEGRAPH COMPANY

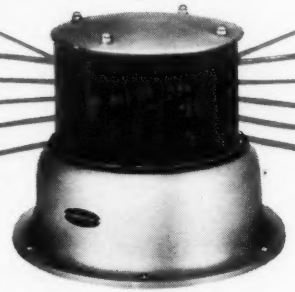
A NATIONWIDE ORGANIZATION

Executive Office: 155 Sixth Avenue, New York 13, N. Y.

The NEW CARPENTER "RAR"

Clears the way... FAST!

The high-power RAR Rotating Beacon is specially designed for fire, state & city police, ambulance, and other requirements where extreme dependability and intensity are essential.



A powerful, colored spot of light rotates horizontally projecting its beam through a full 360°. Mounts on any vehicle roof or may be used as stationary beacon. Sturdy simchrome construction. RAR (Standard Size) $49.50

RAR Sr. Full chrome over bronze and brass $62.50
(Large size as illustrated)

Cap protects lens of every RAR

A Light for Every Emergency Need...

For nearly half a century, Carpenter-Lights have been first choice of fire and police departments, of utility companies, of industry. When you need beacons, portable lights, spotlights, or stand-by emergency lights . . . *You need Carpenter-Lights.*

Complete catalog on request.

CARPENTER
MANUFACTURING COMPANY
202 Bradley Street • Somerville 45, Mass.

MAXIM

offers you the last word in . . .

FUNCTIONAL DESIGN
EYE APPEAL
UTMOST DEPENDABILITY

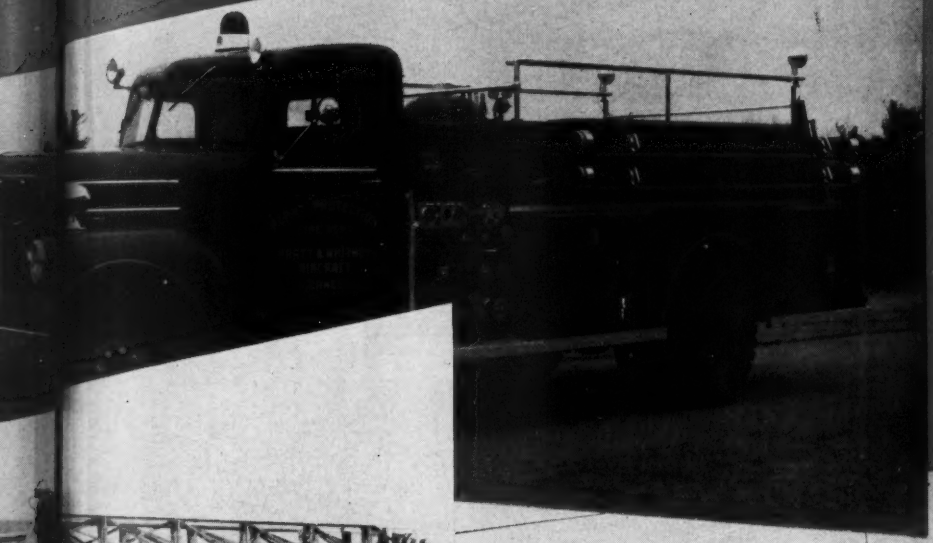
"There's more than meets the eye" is an old expression that certainly applies to Maxim Apparatus. Beautiful creations that they are, you can rest assured that each and every vital part has been soundly engineered and skillfully produced to give the fire service the very finest apparatus possible.

This is one of our standard 65 foot aerials with a big engine designed for a smaller community who needs aerial ladder protection, and at the same time requires high performance.

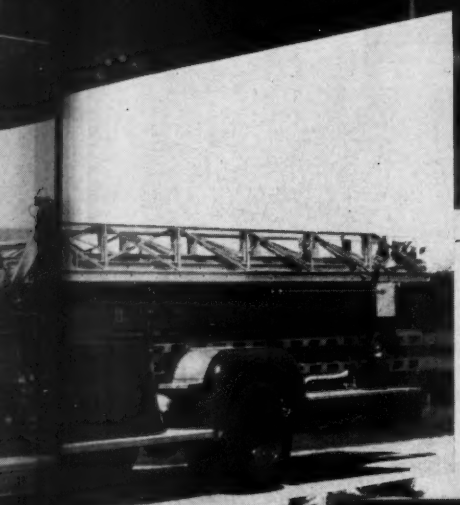
A rescue job built for the City of Springfield. This is designed to carry all types of rescue equipment for first aid runs, for running with each fire call and for heart attacks, etc. It has all of the various rescue equipment required to take care of a city of medium size, and in addition it has space for a complete crew to be under cover. You will note that it has a four-door cab with space for seven men.

MAXIM MOTOR

Built for Pratt & Whitney for their aircraft engine plant and in fact it is one of two units both of which were built to meet a specific requirement.

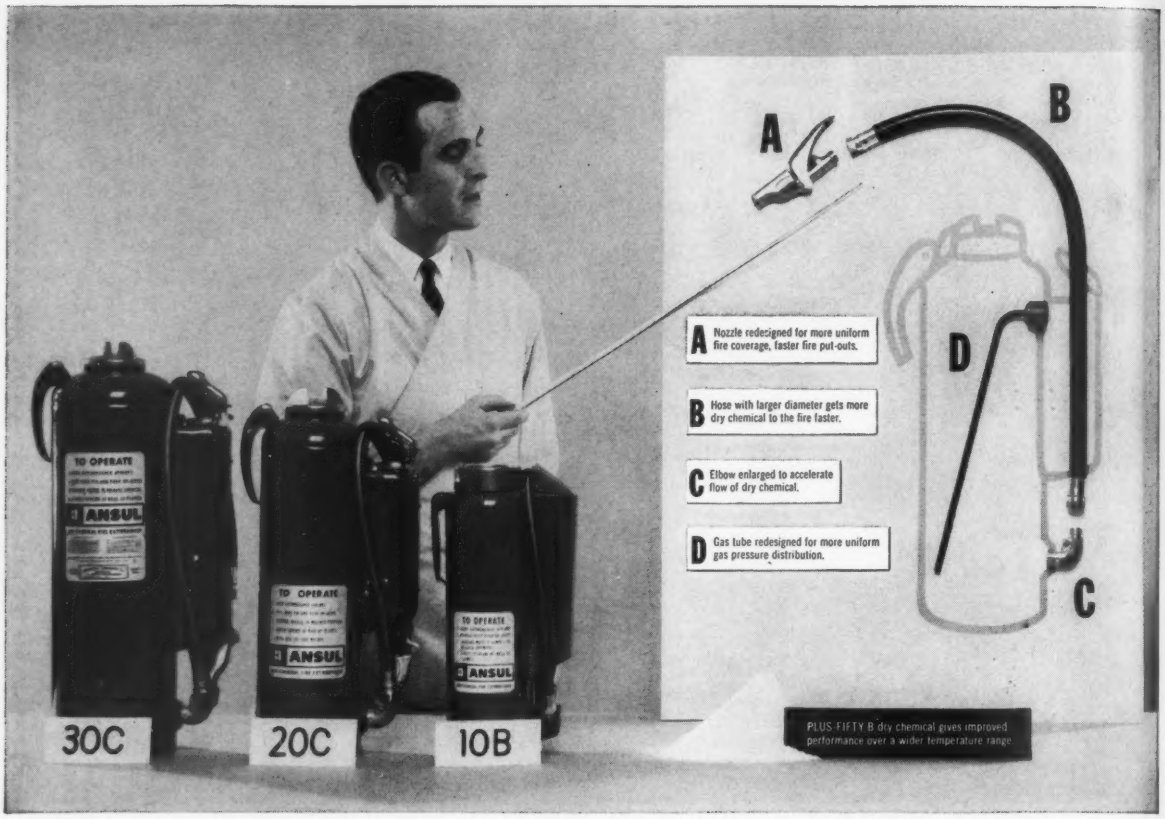


A unit built for the Hollo Hose No. 5 at Ossining, New York. This is a highly special piece of equipment designed with high performance, a 750 gallon pump and space for the men to ride in the body, as well as a lot of compartment space. This is an example of the process of fitting the design to the customer's many requirements.



One of our standard 85 foot tractor trailer aerials with the usual accompaniment of ladders and accessories.

R COMPANY MIDDLEBORO, MASS.


A
B
C
D
A Nozzle redesigned for more uniform fire coverage, faster fire put-outs.
B Hose with larger diameter gets more dry chemical to the fire faster.
C Elbow enlarged to accelerate flow of dry chemical.
D Gas tube redesigned for more uniform gas pressure distribution.
PLUS-FIFTY-B dry chemical gives improved performance over a wider temperature range
30C
20C
10B
TO OPERATE
ANSUL

Important design improvements in these Ansul Extinguishers give you more fire fighting power at no increase in price. Three years of research and more than 2000 fire tests turned up some significant new information on dry chemical extinguishment. Ansul engineers were able to design these findings into three new extinguisher models, the 10B, 20C and 30C. Result, greatly increased fire fighting power. All Ansul equipment is backed by a five-year warranty. This is the best way we know to say Ansul fire extinguishers are the finest of their kind made anywhere.

ANSUL

The Ansul Chemical Co., Marinette, Wisconsin

NEW MOTOROLA T-POWER 2-WAY RADIO

Transistorized Power Supply for both receiver and 25-watt transmitter

Long Life Transistors Replace the Vibrator . . . Reduce Maintenance and "Down-Time"

Already famous for the lowest maintenance and operating costs in the 2-way mobile radio field, Motorola mobile radio is an even better investment now—with the T-POWER unit. The vibrator is gone! . . . replaced by rugged long-life transistors. Gone, too, is the problem of frequent vibrator replacement. Here is a mobile radio with an all-electronic power supply.

New Mounting Flexibility with Plug-In Control Head . . . Same Basic Unit can be Used for Front or Trunk Mounting

With the T-POWER radio, you are no longer restricted to one type of mounting. Install the complete radio, with drawer unit and plug-in control head, for under-dash mounting. For rear mounting the same basic drawer unit can be installed in the trunk and connected by cable to a dash-mounted control head. And—the same basic drawer unit can be interchanged with the equivalent Motorola Twin-V trunk mount radio models operated from a 12-volt negative ground source.

T-POWER radio is another example of Motorola's continuing leadership in the practical application of transistors in mobile radio. Other tested and proved transistorized products include the Dynamic Microphone and Power Voice Speaker.

Get all the facts.—Write now for literature with complete information.

MOTOROLA Communications & Electronics, Inc. · 4501 Augusta Blvd., Chicago 51, Illinois · A Subsidiary of Motorola Inc.

44 NEW MACK PUMPERS

Forty-four new Mack pumpers, with canopy cab-forward design, are joining the many other Macks in the New York Fire Department. First of this type in New York, the pumpers' new design will give added protection to personnel against the hazards of New York's increasingly heavy traffic, variable weather and narrow streets.

The new units have been built to the same uncompromising standards that have made Mack first choice wherever firefighting is carried on under most demanding conditions. And the new design rounds out the entire Mack line of fire apparatus... apparatus famous for never-failing dependability, for ready accessibility of parts, for easy maintenance and for stalwart performance under all conditions.

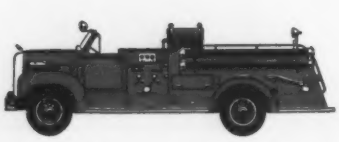
A call to your Mack representative is a *must* when you want the most reliable equipment—whether you're ordering traditionally designed fire apparatus, or have specifications of your own. Mack Fire Apparatus, Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

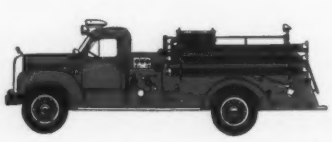
MACK

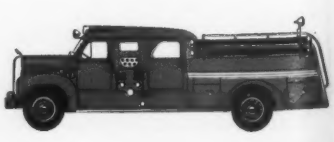
first name for

FIRE APPARATUS

COMPLETE LINE OF PUMPERS—500 TO 1250 GPM...SQUAD AND HOSE WAGONS...AERIALS—65' TO 100'







S FOR NEW YORK

New York's new 750-GPM Mack pumpers, with 5-man canopy cab, are powered by famous Mack Thermodyne® engines. 1250-GPM portable deluge nozzle. 375-gallon booster tank, 300 feet 1" booster hose and fog nozzle.

SEE YOU AT THE I.A.F.C. CONVENTION

Don't miss the exciting Mack exhibit at the International Association of Fire Chiefs' Convention in New Orleans, September 8-12.

...COMBINATION LADDER TRUCKS

MIDWESTERN

Safety Clothing

for Men of ACTION!

The Original MIDWESTERN

STRIPED SAFETY COAT

Reduces Accidents—Saves Lives

When working under hazardous conditions in smoke, fog, dust and darkness, you deserve the safety protection found *only* in the Midwestern Striped Safety Coat. The highly visible yellow stripes are *rubberized as part of the material* . . . not glued, painted or sewed on. Tests show that Midwestern yellow stripes retain their natural color and have the same durability as the black fabric.

There are many imitations but no substitute for the superior quality, design, fabric texture and outstanding safety features of MIDWESTERN SAFETY CLOTHING FOR FIREMEN!

MIDWESTERN COMBINATION SAFETY SUIT

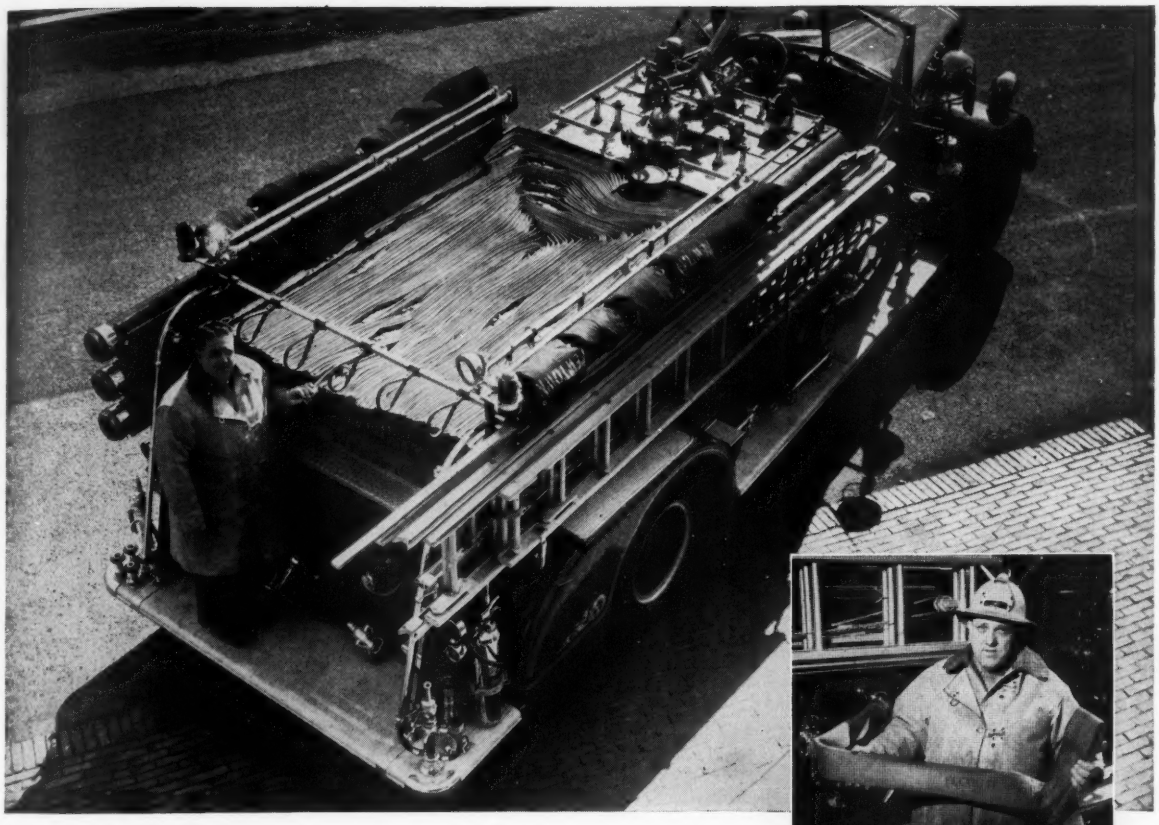
The Midwestern Rubberized Coat and Bunker Pants combination make it easy for firemen to keep both warm and dry even in the most severe weather. Close fitting collar and elastic inner sleeve keep out sparks and water. Pants have double-stitched seams, reinforcing rivets at points of strain. Both garments available with detachable wool linings.

For complete information on our full line of safety clothing for firemen, see your Midwestern dealer. A letter to the factory will also bring you literature and materials for your inspection.

NONE GENUINE WITHOUT THIS TRADE MARK

MIDWESTERN SAFETY MFG. CO. Mackinaw, Illinois

Manufacturers of the Famous **MACKINAW Safety Coats**



William S. Ettenger, Chief of Newtown, Pa. Fire Association, demonstrates the lightness and flexibility found in Flexrite Hose. Large photo shows how Flexrite is packed to put 2400 ft. into truck designed for 1400 ft.

WITH HAMILTON FLEXRITE:

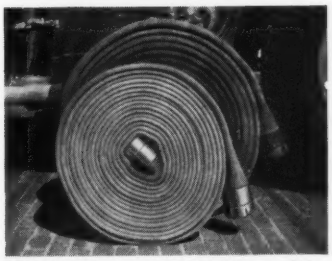
WE GET 2400 FEET OF HOSE IN A TRUCK DESIGNED FOR 1400 FEET

"Nearly twice as much hose in the same space gives this truck the capacity of almost two trucks", reports Fire Chief William S. Ettenger, Newtown, Pa. "We find Flexrite coils in less space, is more flexible and packs easier than conventional hose."

It's lighter in weight, too . . . easier to carry up ladders—gets into action faster. In addition, it's easy to keep clean and dries fast.

OVER 87 YEARS OF SERVICE TO INDUSTRY

Whatever your fire hose problems, it will pay you to write for more information on our complete line of municipal fire hose. Write today—no obligation.



Flexrite Hose, made with Dacron filler cord, placed beside conventional hose illustrates substantial saving in space. Lighter in weight than conventional hose, it is easier to handle, easier to rack.

HAMILTON RUBBER

MANUFACTURING CORPORATION • Trenton 3, N. J.

A Division of Acme-Hamilton Manufacturing Corporation

ATLANTA • CHICAGO • HOUSTON • PITTSBURGH • INDIANAPOLIS • LOS ANGELES • NEW YORK • SAN FRANCISCO

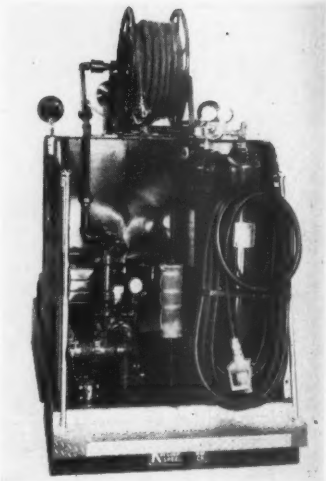
—the answer to

"in plant" protection

THE *Youngster*

A REAL FIRE FIGHTER THAT WILL HIT FAST!

Here is instant, on-the-spot, effective fire protection—the answer in fact— to "in plant" protection—as engineered and produced by men with a lifetime of experience in building fire fighting apparatus. Embodying every new fire fighting technique and including enough equipment to handle all incipient fires—the "Youngster" fills a long felt want in industrial plant protection, and are being used very successfully in large major industries. We believe every industrial plant conscious of fire protection will want more specific information on this new and adequate means of fire protection. We shall be glad to mail additional facts and prices promptly upon request.



Standard equipment includes:

150 gallon vinyl plastic lined booster tank.

Hale HPZL high pressure, remotely started booster pump with gated suction intake.

Booster reel with 200 feet high pressure booster hose and Rockwood SG-47 nozzle.

1½" preconnected line with Rockwood foam proportioner, 100 feet single jacket hose and 1½" Rockwood SG-60 nozzle plus foam applicator.

150 pound dry chemical unit.

2—20# portable dry chemicals.

2—15# C-O-Two extinguishers.

1—Pick head axe.

1—36" crowbar.

1—18" bar.

2—4 cell large hand lanterns.

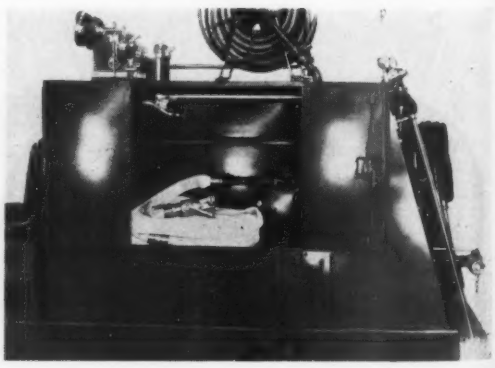
Heavy duty generator with 3 large spotlights in addition to siren and rear red light.

2 large equipment compartments.

Booster tank water level gauge.

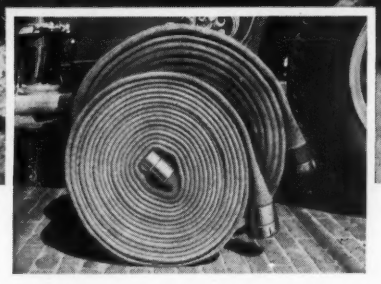
10 gallons Rockwood 3% double strength foam.

Chassis—15 horsepower—2 cylinder air cooled engine
3 speed transmission
15 MPH top speed
96" turning radius
Width—less than four feet
Overall length including rear step—11 feet



YOUNG FIRE EQUIPMENT CORPORATION

1546 William St., Buffalo 6, New York



ENERGY HOSE, made with Dacron* filler cords, placed beside conventional hose illustrates the substantial saving in space which permits you to carry more hose on your trucks.

HAMILTON ENERGY FIRE HOSE—600 POUND TEST

Weighs 20% Less...takes ⅓ less space
Yet *Dacron** gives it 50% more strength

It's easier to carry up ladders because it weighs 20% less than conventional hose. Light weight and flexibility mean easy handling and folding. Hamilton's ENERGY Municipal Fire Hose with its smooth, slow aging, non-acid forming liner, reduces friction loss to a minimum, assures maximum pressure at the nozzle.

OVER 87 YEARS OF SERVICE TO INDUSTRY

ENERGY HOSE is also available with SEALCOTT "W"—a special water repellent and mildew treatment for effectively protecting every cord in the inner and outer jackets against mildew and rot.

Quality control assures the dependability of ENERGY HOSE. Write for full information on our complete line of fire fighting hose.

**Du Pont's trademark for its polyester fiber.*

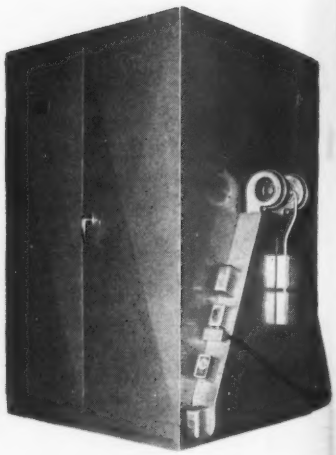
HAMILTON RUBBER

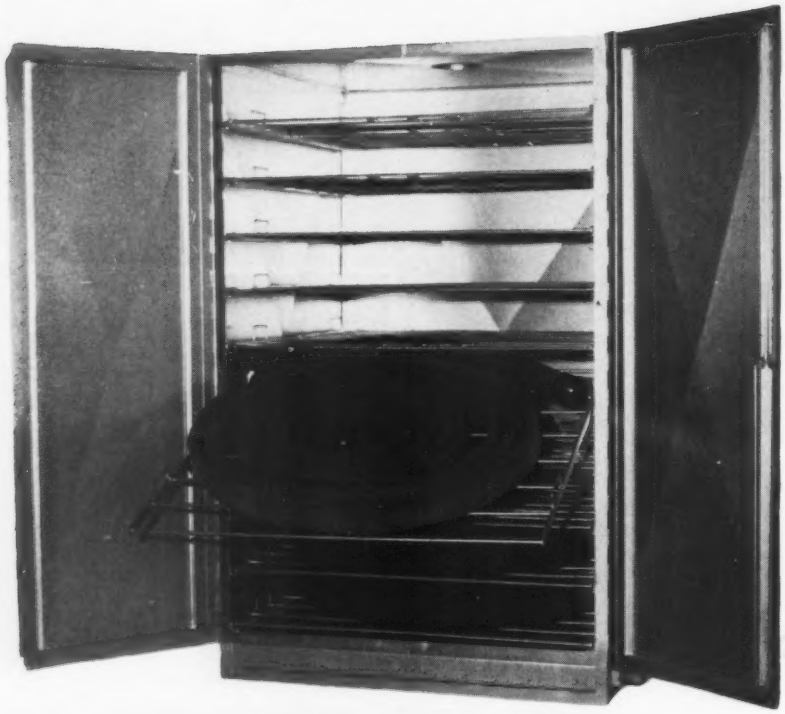
MANUFACTURING CORPORATION • Trenton 3, N. J.

A Division of Acme-Hamilton Manufacturing Corporation

ATLANTA • CHICAGO • HOUSTON • PITTSBURGH • INDIANAPOLIS • LOS ANGELES • NEW YORK • SAN FRANCISCO

it's NEW
it's DIFFERENT
it's MODERN





Used in departments all over the U. S. A. and in Alaska. Some of the many installations are:

Bonneville Power Administration, Ordnance Depot, Ordnance, Oregon; City of Philadelphia, City of The Dalles, City of Denver, (5) Esso Standard Oil Co., Roseburg Rural Fire Dept., City of Harrisburg, City of Dayton, Oregon; Fort Holabird, Baltimore, Md., U. S. Steel Corp., Pierce County Fire District (3) Tacoma, Wn., State of Oregon Oretech, Oregon, City of Goldendale, Washington; City of Newberg, Oregon; City of Molalla, Oregon; City of St. Anthony, Idaho; G.E. Company, Richland, Washington and many, many others throughout the country.

"Forced Air" Hose Dryer

Capacity for 500 feet of 2½" Double Jacket fire hose or 1000 feet 1½" Double Jacket. 220 volt, 60 cycle. Two 3100 watt heat elements. (Total 6200 watts). Two special thermostats—Double Ended "Squirrel Cage" fan. Finish: Red-white or aluminum. Weight: Approximately 1300 lbs. crated. Much faster than towers or drying racks and prolongs the life of hose. All shelves may be removed which leaves the cabinet proper available for drying firemen's clothing or other materials. Shelves interchangeable with other dryers. At slight additional cost units will be equipped with time clocks. Dimensions: 4'6" x 4'6" square, 6'6" high. Both doors have full length hinges and fit tightly when closed. Equipped with pilot light. U/L Approved. List $625.00 F.O.B. Portland, Oregon. Jobbers write for discounts.

Nationally Distributed by

THE NEEP EQUIPMENT COMPANY

326 N. W. Broadway, Portland 9, Oregon

Manufactured by

WESTERN STATES FIRE APPARATUS, Cornelius, Oregon

We also manufacture the Forced Air Smoke exhauster

Please address all communications and inquiries to distributors. ***Valuable territory available to Fire Equipment jobbers.***

A "SURE-FIRE CURE"

that pays off in 3 situations—

1 **CALL REPORT**—GRASS AND BRUSH FIRE
Snuffed out by driving around perimeter of fire with man on rear step operating 3XD from pumper tank. Fighting fire "on the move" saves time—conserves water.

2 **CALL REPORT**—FARM BUILDINGS
Saved barn with water drawn from stream the pumper couldn't reach. Used 3XD as booster to pumper.

3 **CALL REPORT**—RESIDENCE
Fire confined to one wing. Left 3XD to pump out basement and a good thing—had another call on arrival at station.

IF YOU GET a lot of calls like these, you'll find the 3XD Auxiliary Pump one of the most useful, valuable pieces of equipment money can buy.

FOR 3 COMMON types of fires, the 3XD will "speed the cure" by adding extra mobility, capacity and versatility to your operation — and at low cost.

FOR DETAILS, WRITE FOR 3XD BULLETIN 8120

★ AMERICAN ★
FIRE PUMP COMPANY

BATTLE CREEK, MICHIGAN, U. S. A.

AMERICAN FIRE PUMP

Model 3XD

Used as mobile pump, booster, or to pump out basements. Supplies two 1½" hose lines with ½" nozzles, or one 2½" line with ¾" nozzle. Handles dirty water without serious damage.

for power to spare
on the way... at the fire...

Specify

Leece-Neville ALTERNATOR SYSTEMS

the best generator equipment you can buy!

Two-way radios, sirens, warning lights, rescue equipment—all combine to place a heavy load on your apparatus batteries. More of a load than the batteries can handle—*unless* you've installed Leece-Neville alternator systems!

Because they produce charging current *as soon as the engine starts*...enough to handle two-way radio transmitting loads... Leece-Neville alternators keep batteries charged . . . ready for fast, sure emergency starts in coldest weather!

And, high speeds can't damage L-N alternators ...they're designed for operation up to 12,000 rpm! What's more, L-N constant voltage level control assures peak radio performance . . . lengthens life of radio components.

Leece-Neville alternators, the original ac-dc generating system, have been used since 1946 as standard generating equipment on hundreds of fire apparatus fleets, both large city and rural volunteer departments. On any type of apparatus, large or small, L-N alternators will set new standards of performance while reducing operating and maintenance expense. For all the facts, see your local L-N distributor or write direct to The Leece-Neville Company, Cleveland 3, Ohio. *Distributors in principal cities . . . service stations everywhere.*

plenty of 110 volt power, too!

For abundant 110 volt power to operate floodlights, power tools, rescue equipment, etc., install a Leece-Neville 110 volt transformer and rectifier in conjunction with the alternator. Ask for special bulletin.

AA 6014

YOU CAN RELY ON Leece-Neville

Automotive Electrical Equipment Since 1909

TRUCK • BUS • DIESEL • INDUSTRIAL • PASSENGER • RAILROAD • MARINE • OFF-HIGHWAY

ALTERNATOR SYSTEMS · D C GENERATORS · REGULATORS · CRANKING MOTORS · SWITCHES · SMALL MOTORS

DUO Safety

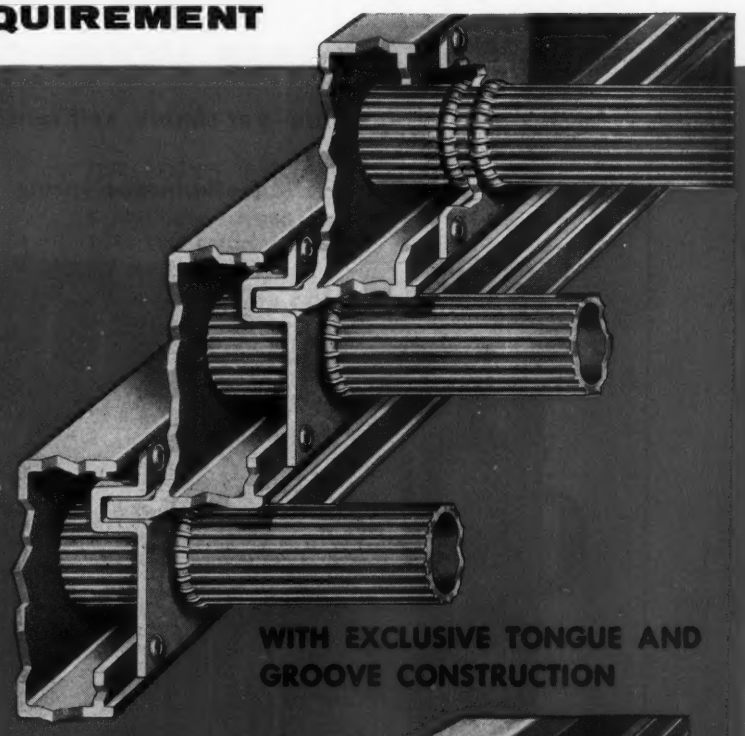
FIRE LADDERS

NOW...YOUR CHOICE OF AN ALUMINUM FIRE LADDER FOR EVERY USE... EVERY REQUIREMENT

ERIES 1000-A

r Pumper Use

Featuring lightweight Channel Rail Con-oon, and is the substitute, in aluminum, for ide wood ladders. This outstanding fire has exclusive tongue and groove arrange-, Duo-Safety's construction development holds sections together firmly, rigidly, with ooks, guides, or obstructions of any kind! ures minimum banking height. In two and sections, in lengths up to 30 feet. Rail di-ons—1¼" x 2¾".

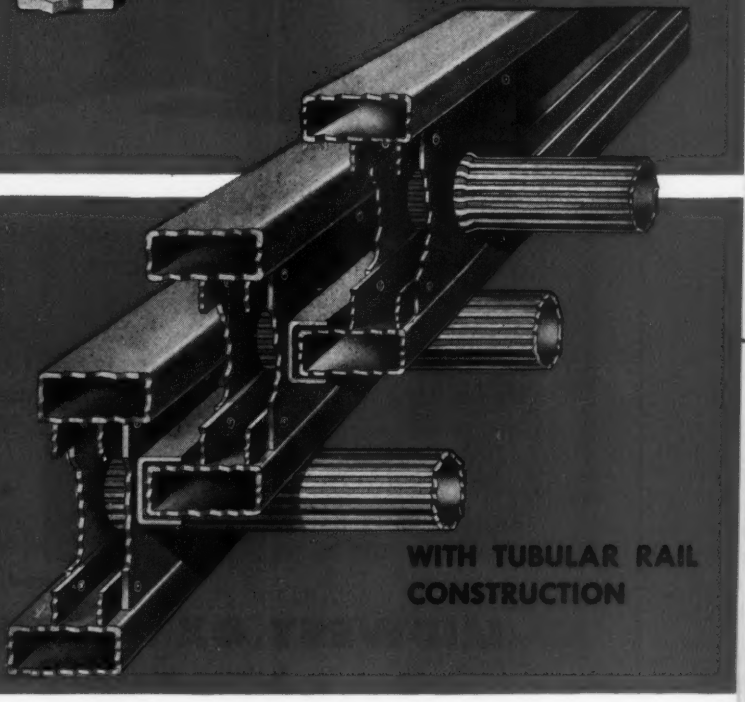


WITH EXCLUSIVE TONGUE AND GROOVE CONSTRUCTION

ERIES 900-A

r Service Trucks d Pumper Use

An intermediate ladder in both size and t, the 900-A Series features slightly heavier truction than the 1000-A Series, but has the outstanding features. In two and three sec-...in lengths up to 40 feet. Rail dimensions " x 3¼".



WITH TUBULAR RAIL CONSTRUCTION

ERIES 500-A

r Service Trucks

Famous aluminum fire ladder that replaces truss ladders and features Tubular Rail truction for greater strength and extraor-y safety. Adopted as standard ladder equip-by fire departments the country over. Made of and wall ladders...and in two and three on extensions in lengths up to 65 feet.

DUO Safety

DUO-SAFETY LADDER CORPORATION

809 NINTH STREET
OSHKOSH, WISCONSIN

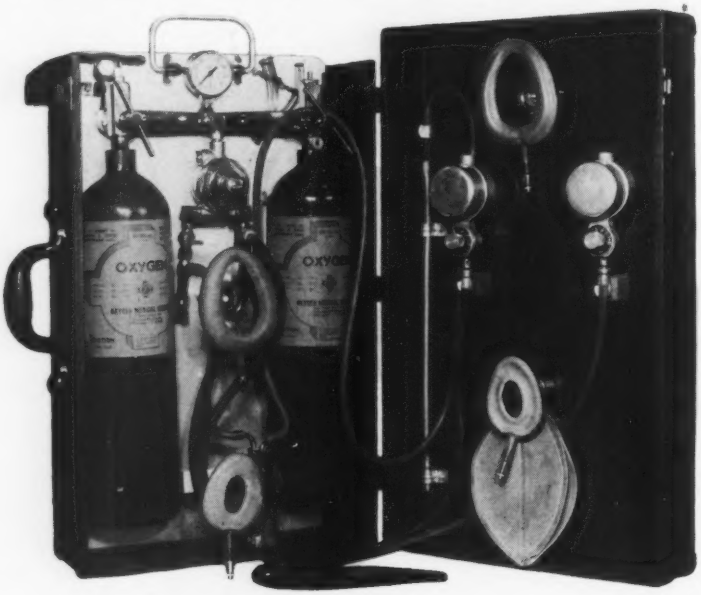
In Canada: LaFrance Fire Engine and Foamite, Ltd., Toronto

REVIV-A-LIFE©

RESUSCITATOR
INHALATOR
ASPIRATOR

equipped with BAER MODEL CONTROL VALVES

- ***Safe and dependable- yet simple, self contained, light weight, for ease of operation.***
- ***The new Venturi Action eliminates spring and toggle mechanism and reduces service requirements.***



Easy To Carry—

Mounted on a removable aluminum panel, Reviv-A-Life weighs only 35 lbs. including two "D" tanks (45 lbs. in carrying case)—can be carried by one hand.

Seven Models To Choose From — Illustration at left shows the popular PR-802 Dual Model.

The REVIV-A-LIFE RESUSCITATOR is an automatic breathing machine which will rhythmically inflate and deflate human lungs with safety.

All oxygen controls to regulate resuscitation or inhalation are in the control valve which is held in the hand. This feature enables one operator to service the patient at any distance from the supply tanks—important when the resuscitator must be used in limited space.

The REVIV-A-LIFE changes from resuscitation to inhalation automatically. Even an inexperienced operator cannot commit an error. Aspiration immediately available.

- **ATTRACTIVELY PRICED**
- **SATISFACTION GUARANTEED**

Write for literature, prices and name of nearest dealer. No obligation.

Manufactured by

MIDWEST OXYGEN EQUIPMENT CO.

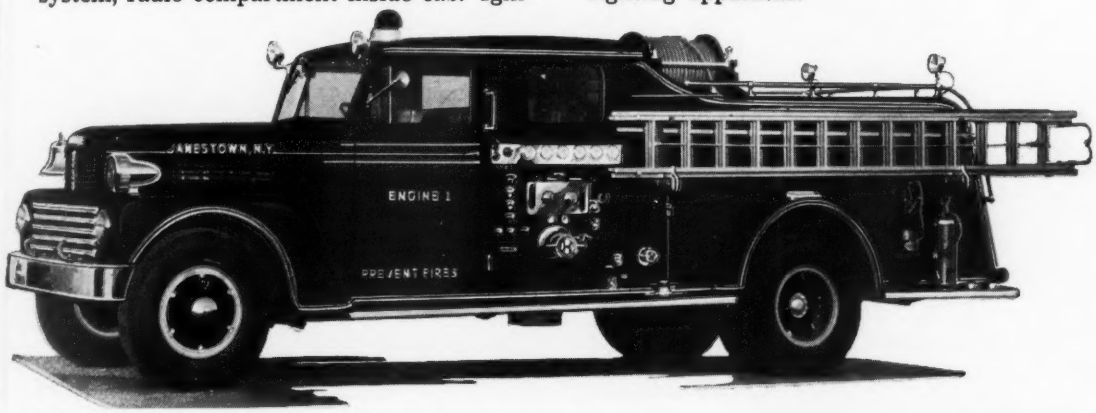
Exclusive licensee under patents pending

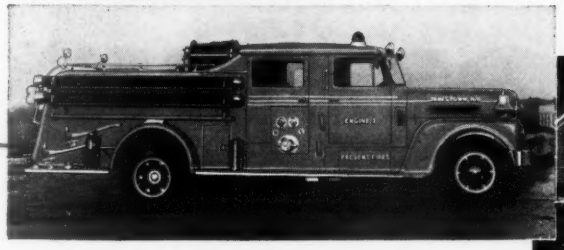
1664 West Ogden Ave. MOnroe 6-2330 Chicago 12, Illinois

REPAIRS ACCESSORIES REFILLS TANK TESTING

Pride of the Department . . .
Dependable Performer . . .
. . . A HOWE DEFENDER

In this triple combination 1,000 GPM pumper with five-man sedan type cab, a full crew will get to fires in Jamestown, N. Y., under maximum protection, ready for action with today's most modern fire fighting equipment. Powered with a 250 HP Waukesha slow-speed engine, this custom built HOWE DEFENDER has dual ignition, dual batteries, dual fuel pumps, a Leece-Neville 100 ampere high output generating system, radio compartment inside cab. Ignition system is operated by a single four-position switch. Batteries are mounted on a sliding tray for servicing. Booster tank, with removable top, has 300 gallon capacity. Exclusive Howe pump prime indicator. Hose carrying capacity is 1,500 feet of 2½" line. Six built-in compartments. These are among the features important to reducing fire losses which are available in a HOWE pumper. Look to HOWE first for the best in fire fighting apparatus!





Cab interior is completely, handsomely lined. Fully adjustable Bostrom driver's seat. Two men ride in front, three on full width seat facing rear. Three doors, two on officer's side. Sliding glass window installed in rear of cab. Our complete line includes the truck and equipment YOU need!

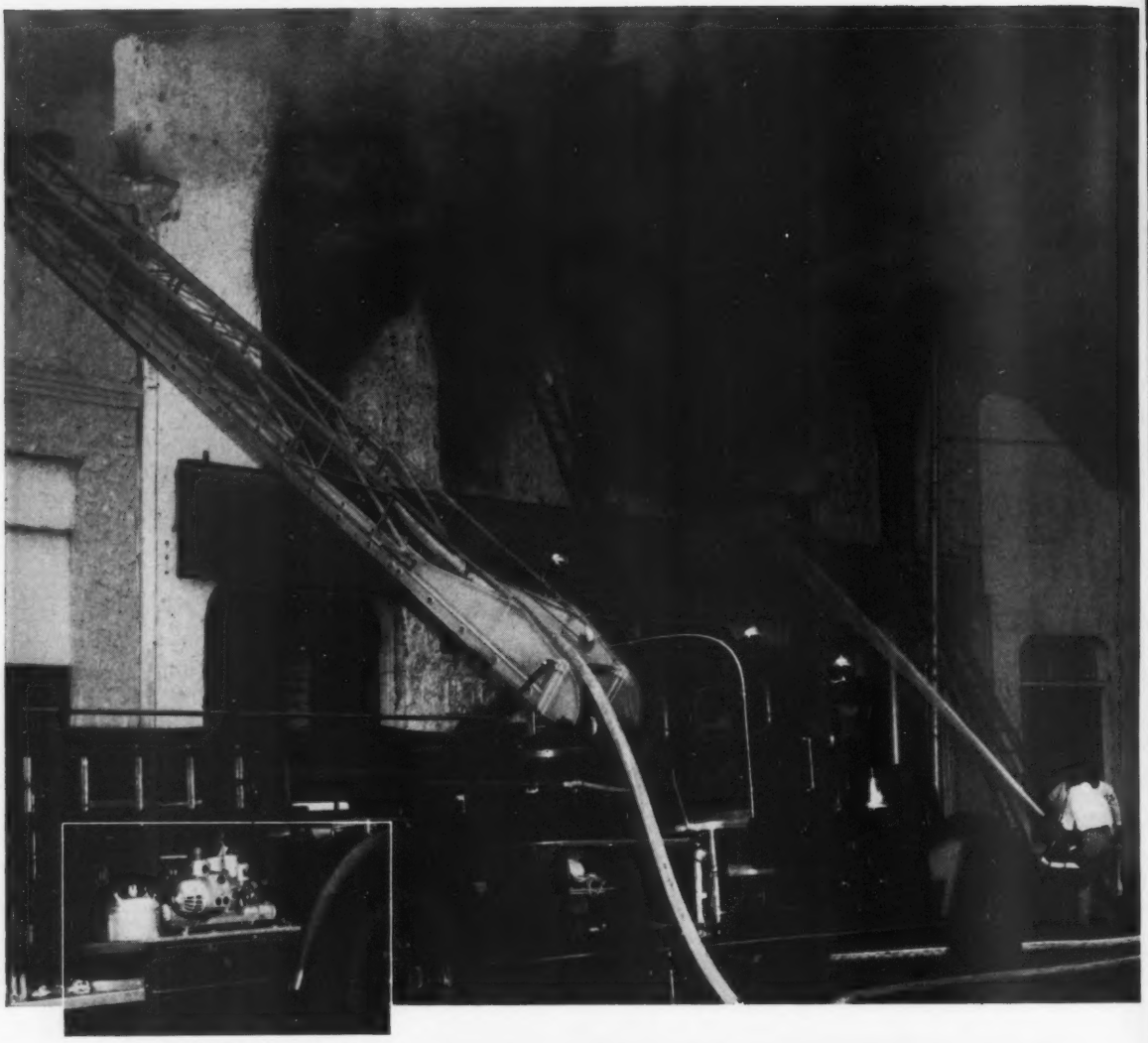
HOWE

APPROVED BY THE
NATIONAL BOARD OF FIRE UNDERWRITERS

"dependable fire apparatus since 1872"

FIRE APPARATUS COMPANY

Dept. FE87, 1406 W. 22nd St., Anderson, Ind., U.S.A.



Jacksonville, Florida Fire Department truck and Homelite 23A115 Generator — on the job — at a recent fire in Jacksonville.

Instant POWER that can be carried anywhere!

Fire Departments throughout the country use Homelite Generators . . . and it's easy to see why. Lightweight Homelite Generators feature constant voltage control, generous overload capacity, proven dependability . . . and they're easy to carry anywhere to provide power whenever it is needed — quickly, effectively, economically.

For example, the photograph above shows a Homelite Model 23A115 Generator — ready for action — on a Jacksonville, Florida Fire Department truck. This 1500 watt, gasoline-engine-driven unit provides 115 volt, 60 cycle, alternating current. It starts fast in any weather . . . supplying electric current identical to normal house current — perfect for emergency stand-by use, operating electric tools and floodlighting fire scenes at night.

If you are not already using a lightweight, dependable, Homelite Generator — get in touch with the nearest Homelite representative. There's a Homelite Carryable Generator for every power requirement . . . in all standard voltages . . . capacities up to 5000 watts.

Manufacturers of CARRYABLE PUMPS, GENERATORS, BLOWERS AND CHAIN SAWS

HOMELITE

A DIVISION OF TEXTRON INC.
308 RIVERDALE AVENUE
PORT CHESTER, NEW YORK

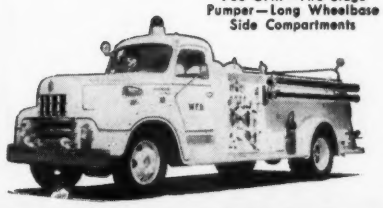
BOARDMAN PUMPERS

...engineered for YOUR Community!

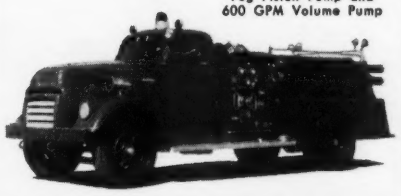
Your community deserves the best . . . and the best is a Boardman Pumper unit. Designed for any size city, Boardman Pumpers offer the most efficient, economical fire protection it is possible to buy. Equipped with dependable Waterous pumps, these units will give years of trouble-free service. Available with pump capacities of 200, 500, 600, 750 or 1,000 GPM. Your unit can be designed with special booster tanks, compartments, or equipment built to your specifications. Dependable . . . and economical, that's a Boardman Pumper. It can be mounted on the standard chassis of your choice or on a Boardman custom unit. Write today for complete information! Learn how your community can have economical Fire Protection with a Boardman Pumper unit.

They're efficient!
They're attractive!
They're economical!

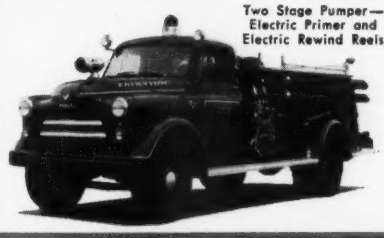
750 GPM—Two Stage Pumper—Long Wheelbase Side Compartments



Combination High Pressure Fog Piston Pump and 600 GPM Volume Pump



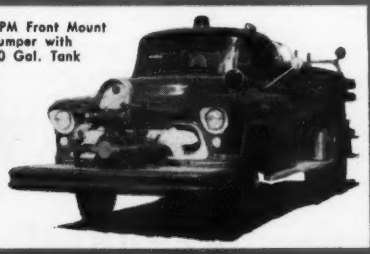
Two Stage Pumper—Electric Primer and Electric Rewind Reels



200 GPM Rural Unit Power Take-off Pump—500 Gal. Tank

750 GPM Custom Pumper 240 H. P. Dual Ignition Waukesha Engine

500 GPM Front Mount Pumper with 500 Gal. Tank



MANUFACTURING DIVISION

THE BOARDMAN CO.
OKLAHOMA CITY
1401 SOUTHWEST 11TH
BRANCH OFFICE: TULSA, OKLAHOMA

MANUFACTURER OF DEPENDABLE PUMPERS AND TANKERS

for lighter weight and GREATER STRENGTH

SPECIFY

REPUBLIC'S DACRON FILLER

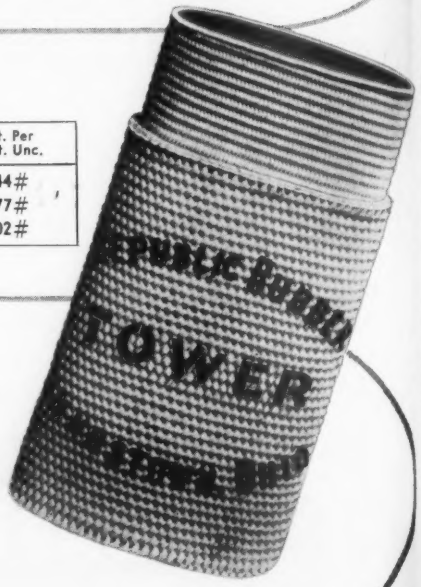
MUNICIPAL FIRE HOSE

Champion 600# Test Pressure

Size	O.D.	Test Pressure	Wt. Per C Ft. Unc.
1½"	2 "	600#	45#
2½"	3 1/16"	600#	79#
3 "	3 5/16"	600#	107#

Tower 400# Test Pressure

Size	O.D.	Test Pressure	Wt. Per C Ft. Unc.
1½"	1 31/32"	400#	44#
2½"	3 3/4"	400#	77#
3 "	3 13/32"	400#	102#



In addition to these Dacron Filler types, Republic makes two Cotton Filler, Double Jacket types: K-122 Chariot and K-127 Target, both for 400# Test Pressure.

Republic Municipal Fire Hose is Provar Processed as standard construction for mildew prevention and is flat-cured, permitting easy handling and storage of more footage. Send us your order or request for quotation.

"Quality Hose Builders for Over 50 Years"

REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN 1, OHIO

INDUSTRIAL RUBBER PRODUCTS

DEFEND YOUR COMMUNITY

Fire Equipment—American LaFrance. Power—Continental Red Seal S-6749 Engine.

--- with ---
Equipment Using CONTINENTAL POWER

Fire apparatus is subjected to the sort of usage which underscores the need for extra care in its choice. Here, as in any field where round-the-clock reliability is a must, it's wise to standardize on a leading make —a make that features Continental Red Seal power.

Red Seals are the product of more than a half-century of specialized experience. Every model is engineered expressly for the job to be done . . . and backed by factory-authorized service and genuine Red Seal parts throughout the world.

●

ONLY IN CONTINENTAL RED SEAL WILL YOU FIND ALL THIS: Full-Length Water Jackets • Patented Individual Porting • Tocco-Hardened Counterbalanced Crankshaft • Seven Main Bearings • Alloy Steel Valve Seat Inserts • Leakproof Water Pump • Built-In Oil Cooler • Positive Crankcase Ventilation • Positive Rotation Exhaust Valves.

●

CONTINENTAL MOTORS ® Powerful as the Nation AMERICA'S STANDARD

Continental Motors Corporation
MUSKEGON, MICHIGAN

WORLD'S LEADING INDEPENDENT MANUFACTURER OF INTERNAL COMBUSTION ENGINES, CONTINENTAL MOTORS OPERATES PLANTS IN ATLANTA, DALLAS, DETROIT, MILWAUKEE, MUSKEGON, AND TOLEDO, AND IN ST. THOMAS, ONT., PRODUCING AIR-COOLED AND LIQUID-COOLED ENGINES FOR USE ON LAND, AT SEA AND IN THE AIR.

J. M.
Established 1860

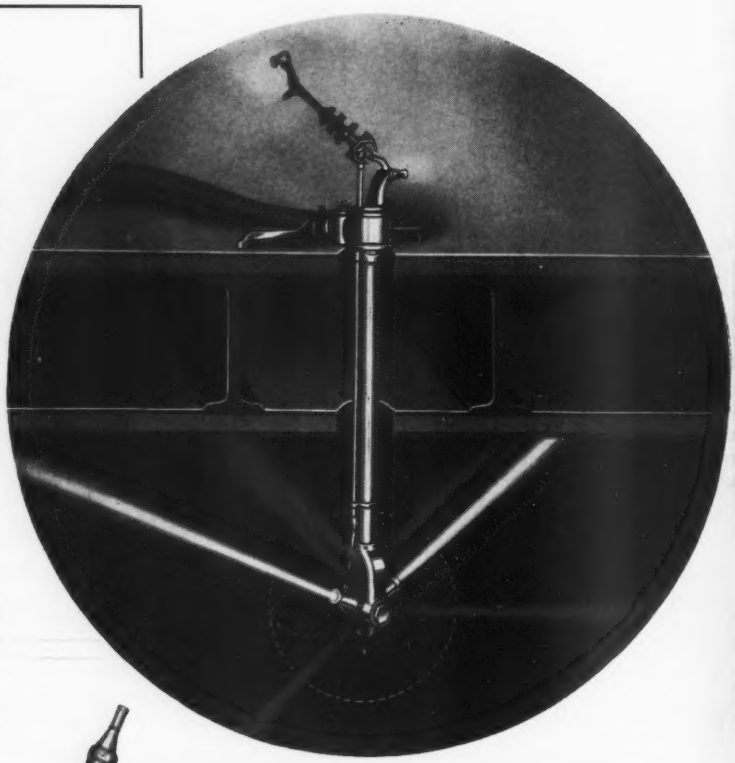
BAKER

in Fire Service Only The BEST is good enough—

fire fighting equipment

Famous BAKER CELLAR PIPE

Fights fires between decks, under dock, through roofs—walls or any blind spot. Throws two, one inch streams from two to sixty feet, and nozzle works up-down and completely around. Every ship and every fire department should carry this unique and very effective pipe. Comes with brackets and locking device and fog tips if desired. Try it before you buy it —backed by "money-back" guarantee.



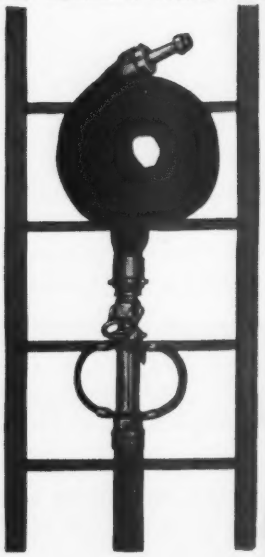
BAKER Universal TURRET PIPES

Either hand or gear operated these BIG stream throwers are in use in many fire departments and as fixed protection in Industrial Plants. Can be used as a portable or fixed unit on pumpers, in which case it operates from turntable. Can be had with 2, 3, or 4 way siamese with automatic clapper valves. Fog tips available.

We appreciate your inquiries —Write:

BAKER LITTLE GIANT PLAY PIPE

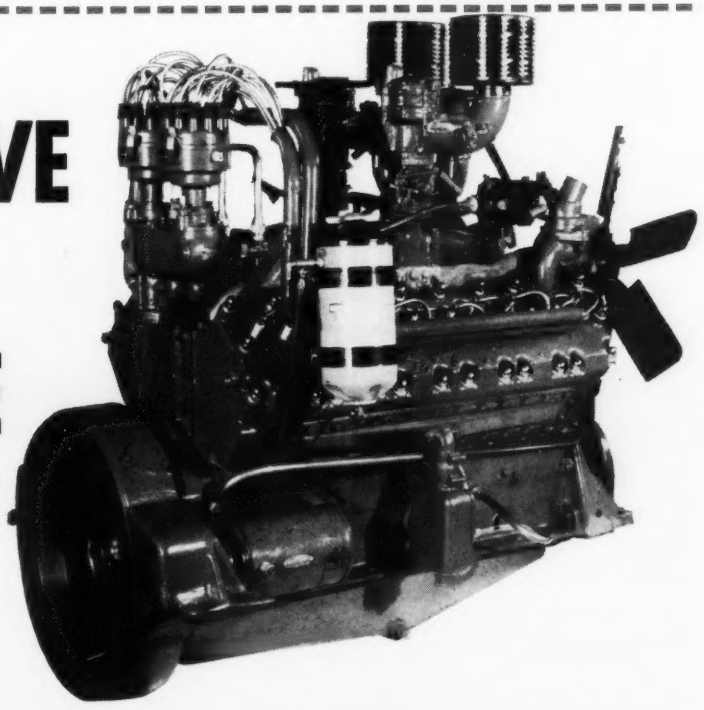
The Baker 1½" and 2½" Shut-Off Nozzle and Little Giant Play Pipe has a 2½" Universal Thread Size on the inlet and outlet for making quick changes. No packing, but a phosphor bronze sealing ring to last a lifetime. Most adaptable of any playpipe and a favorite in many departments. Our fog tip attached in seconds while line is under pressure.



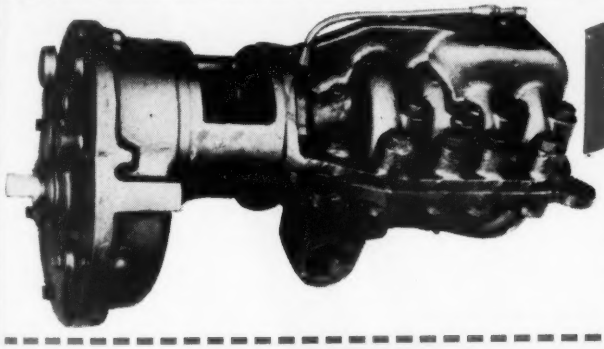
J. M. BAKER PATTERN CO., INC.

68 Sprague Street, Providence 7, R. I.

New SEAGRAVE V-12 ENGINE



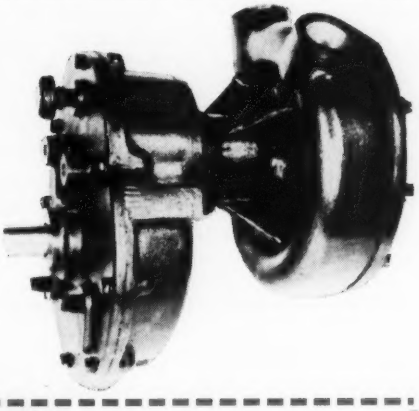
New Model 531 with 251 H.P. Modified breathing system with larger inlets in cylinder blocks; special design cylinder heads; increased area around inlet valves; larger inlet manifolds; increased size down-draft carburetors; new type pressure governor; new engine-driven fly ball governor; new type air cleaners with reduced flow resistance; new crankcase ventilating system; improved engine cooling; low compression ratio 7.9 to 1.



New SEAGRAVE HIGH PRESSURE PUMP

This 4-stage pump now has replaceable plastic impregnated packing to eliminate any necessity for disassembling pump to adjust or replace packing. Standard SAE transmission power take-off drive permits use of pump when truck in motion. Fine grain bronze construction making possible working pressure in excess of 1000 pounds per square inch.

New SEAGRAVE BOOSTER PUMP



Small and compact with same transmission case and gears used on four-stage high pressure pump. Operates pumping from booster tank or fed from hydrant by 2½ inch hose. Bronze impeller mounted on stainless steel shaft. Shaft seal is carbon ring mounted in rubber running against hard faced ring for long, trouble-free service. Pump shaft and input shaft mounted on ball bearings. Gear teeth all flame hardened.

SEAGRAVE—The Greatest Name In Fire Apparatus

MAIL THIS COUPON

THE SEAGRAVE CORPORATION—Columbus 7, Ohio

Send complete information on ☐ New 531 Engine ☐ New High Pressure Pump ☐ New Booster Pump

or ☐ .....

(Use above line for any special information you desire concerning Seagrave Fire Apparatus)

Name_____ Title_____

Street Address_____

City_____ State_____

F.E. 8-57

Now! 3 Alco-Lite Ladders for short wheelbase Pumpers... Old or New

Shown above is an Alco-Lite Pumper Roof Ladder and 2 Section Extension Ladder nesting in brackets designed for wood ladders. The nested thickness of the two is 6⅞". This pair not only makes an ideal replacement on old Pumpers but is very desirable equipment on new Pumpers.

3 Section Pumper Extension Ladder

The newest addition to the Alco-Lite Pumper series is a 3 Section Pumper Extension Ladder which is made in 30' and 35' models. Only 7" thick, the 3 PEL will nest by itself in brackets found on most Pumpers. On new Pumpers, the 3 PEL can be specified to nest with an Alco-Lite Pumper Roof Ladder. The 3 Section Pumper Extension Ladder has a rope and cable arrangement which allows the ladder sections to extend simultaneously. It is also equipped with spring loaded locks which operate automatically at any desired point.

Always specify Alco-Lite Aluminum Ladders

Alco-Lite Pumper Ladders are stronger and easier to handle because they are made of high tensile strength, industrial, aluminum alloy. Their deeply grooved, 1¼", rungs are permanently attached to the extra heavy gauge, double channel, side rails with expansion bushing construction. Alco-Lite Pumper Roof Ladders feature, in addition, extremely strong, folding steel hooks.

original manufacturer of aluminum ladders

ALCO-LITE

Aluminum Ladder Company

WORTHINGTON PENNSYLVANIA

DURA-FOG

- Stream can be selected by sight or touch
- Clicks into straight stream or desired fog pattern
- Floating gland type shut off
- Shock absorbent shut-off mechanism
- No kick back
- Rubber bumper
- Sturdy handle

VISIT WITH US IN NEW ORLEANS AT BOOTH 38

PLATE 261

FOG CHIEF

- Compact
- Advantage of shut off, straight stream, and a variety of fog patterns
- Operates easily under high pressure
- No kick back
- Rubber bumper

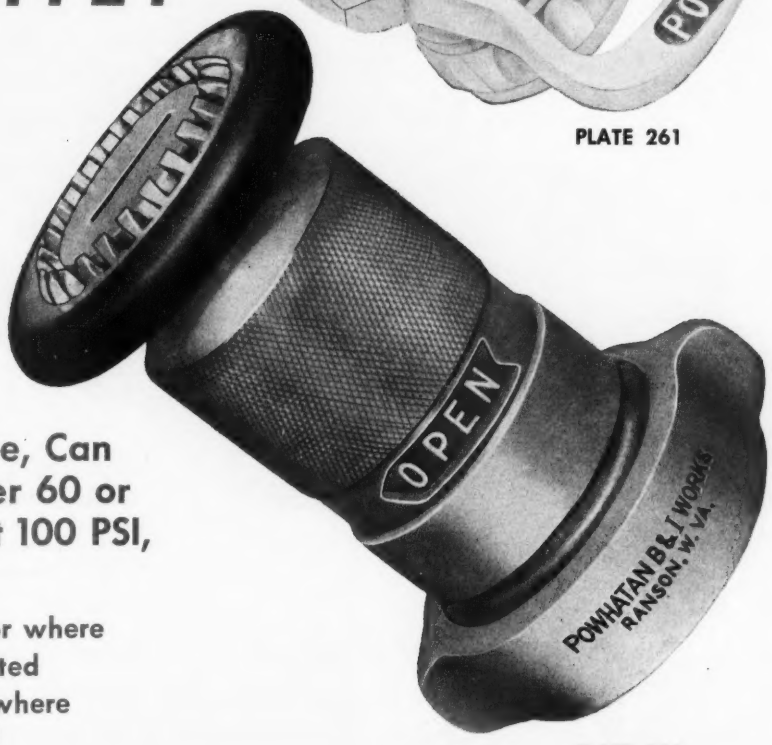


PLATE 262

Both Nozzles, 1½" Size, Can Be Supplied with Either 60 or 100 GPM Discharge at 100 PSI, 30° Fog Pattern.

60 GPM for rural areas or where water supply is limited
100 GPM for cities or where water is plentiful

Our **65** th Year

POWHATAN BRASS and IRON WORKS
RANSON, WEST VIRGINIA
Phones 93 & 94 Charles Town, West Virginia
Established 1892

OREN

BUILDERS OF QUALITY CUSTOM-BUILT APPARATUS,

ALSO CONVERSIONS OF ALL MAKES OF

COMMERCIAL CHASSIS

TO MEET THE INDIVIDUAL REQUIREMENTS OF THE FIRE SERVICE CUSTOMER . . .

Shown above is a Commercial Chassis Converted by OREN to the exacting Requirements of Windber Fire Company, Windber, Pennsylvania. Note the Front Fenders which were completely redesigned from the Original along with many other improvements in utility and appearance.

We will be happy to have a qualified Representative discuss your Requirements with you — No Obligation

"The South's Only Fire Truck Manufacturer"

OREN ROANOKE CORPORATION

ROANOKE 2, VIRGINIA

Headquarters for Fire Department

BRASS GOODS

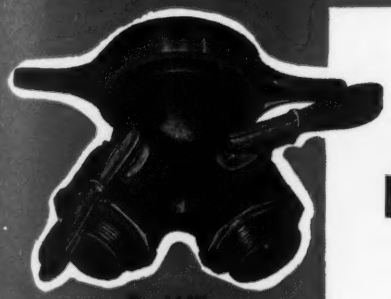


Fig. 164N
4½" swivel female x two 2½" male Gated Siamese. Quick opening. Fog nozzles.

Fig. 182
Made either Right Hand or Left Hand 2½" male x female, gate valve.

McINTIRE BRASS WORKS

Pioneers in Nozzle Manufacture

ORIGINATORS and sole Mfgs. of

INVINCIBLE NOZZLES

We invite figuring or bidding on all types of brass work

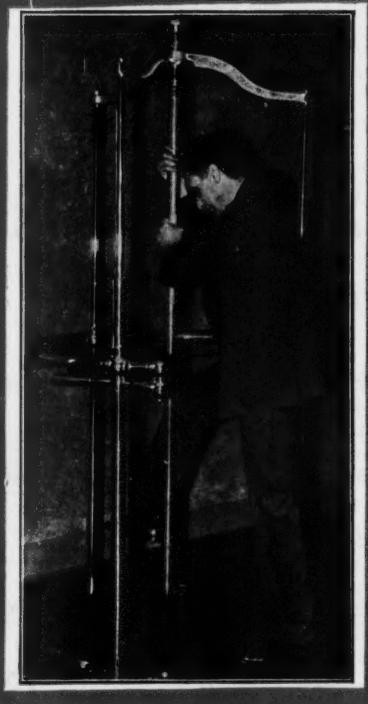
Fig. 156
"MORSE" SHUT-OFF NOZZLE AND PLAYPIPE COMBINATION

FIREBOAT TOWER NOZZLE

Operated by Remote Control

with full Transverse Control

Figure 114-B
— one of many — made by pioneers in nozzle manufacture



AUTOMATIC-OPERATING SHUTTER AND SLIDING POLE

For the FINEST BRASS GOODS

Specify McINTIRE

15 feet high
6500 G.P.M.
5" tip.

F. N. McINTIRE BRASS WORKS 377 Putnam Avenue Cambridge 39, Mass.

Fire-fighting vehicles which must keep on fighting call for . . .

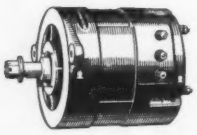
Delco-Remy Extra-Duty Electrical Equipment

to supply the extra electric power they need

In all kinds of weather and for hours on end, fire-fighting equipment must be able to stay on the job. *Dependable* and *ample* electric power is a must for the extra-heavy demands of floodlights, two-way radios and other special electrical units with which modern fire-fighting vehicles are equipped.

Delco-Remy extra-duty d.c. or a.c.-d.c. charging systems assure the extra electrical power needed in such service. Their special performance characteristics keep electrical accessories working at top efficiency. Delco-Remy extra-duty generators with matching regulators protect batteries against excessive discharge and cycling effects. Batteries stay charged, and last longer.

Be sure to specify Delco-Remy extra-duty electrical equipment, including the new longer life Delco batteries, on the new vehicles you order, and when you re-equip present ones. Both 6- and 12-volt a.c. and d.c. application packages are available.



Model 1117105 is a Delco-Remy 12-volt a.c. generator widely used on fire-fighting vehicles. This dependable unit can provide up to 105 amperes under pumping conditions.

GENERAL MOTORS LEADS THE WAY—STARTING WITH

Delco-Remy

ELECTRICAL SYSTEMS

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

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The International Association of Fire Chiefs is to be commended for the splendid work it is doing toward the advancement of the Fire Service.

The Bi-Lateral Fire Hose Company says:

"Every Fire Chief should be a member of IAFC"

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Sustaining member of IAFC
In Canada
Bi-Lateral Fire Hose, Kitchener, Ontario

NOW *FOR THE FIRST TIME—*
2 ATLAS LIFE NETS

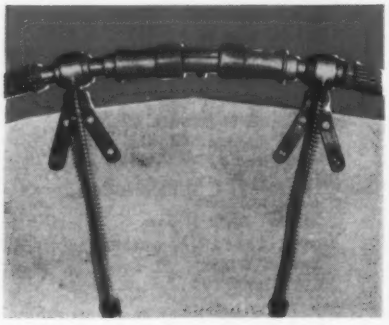
1. ATLAS "DELUXE". *Proven the safest and most dependable. Used by "Safety-First" Fire Chiefs, and responsible for many effective rescues.*

2. ATLAS "400". *Right for your budget - in competative price range, but what a difference in quality. Check chart below.*

NOW YOU CAN COMPARE AND SEE WHY ATLAS LIFE NETS ARE SAFER, MORE DURABLE AND EFFECTIVE

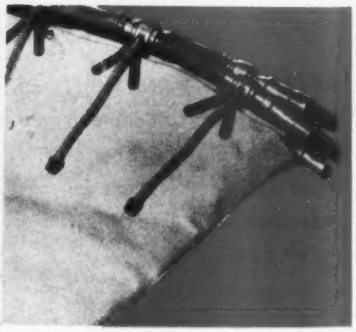
SAFETY POINTS TO REMEMBER	ATLAS "DELUXE"	ATLAS "400"	OTHER MAKES
HINGES	ATLAS hinges are quick action, self locking. Sleeves conceal hinge springs. Prevent injury to men. ☑	ATLAS hinges are quick action, self locking. Sleeves conceal hinge springs. Prevent injury to men. ☑	Spring is open, unconcealed. Dangerous to men. ☒
STRAPS	Twin leather straps, secured by four rivets, give additional safety. Prevent ripping of net bottom. ☑	Twin leather straps, secured by four rivets, give additional safety. Prevent ripping of net bottom. ☑	Only one strap, safety cut in half. Rivets can pull out. ☒
SHOCKS	Dual shock absorbers, spaced evenly, absorb shock normally taken by men. Makes net easier, safer to handle. ☑	Springs tested for resiliency and quick action. ☑	Spring secured to net by only one strap. ☒
HAND GRIPS	Molded rubber hand grips 7" long, easy rotation, prevent friction burns. ☑	Molded rubber hand grips, 9½" in length. Prevent friction burns. ☑	Fabric hand grips. Water and atmospheric conditions require early replacement. ☒

EXCLUSIVE ATLAS FEATURES



Atlas Hinges and Sleeves—Safer—Prevent Injury

Twin Leather Straps Spaced Evenly—Added Safety



Dual Pat. Shock Absorbers Make Safe Rescues Possible Without Shock to Firemen.

THE ATLAS "400"

If conditions are ever such that you can't specify an ATLAS DELUX—you can safely buy our ATLAS 400 and feel confident you've got the next best. Be sure to insist on ATLAS!

WITH OUR COMPLIMENTS:

Manual No. 57 "Life Net Training and Maintenance."

FREE: An inspection of your net. Write for details.

ATLAS SAFETY EQUIPMENT CO., INC.

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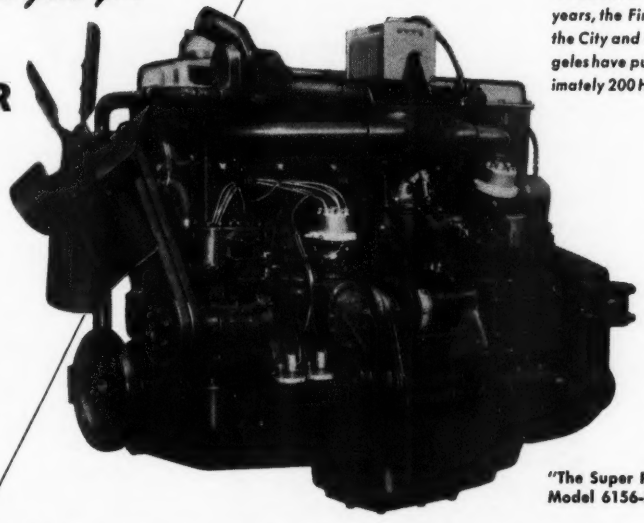
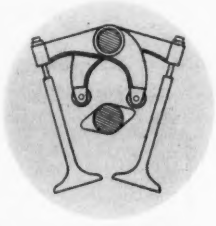
Visit us at I.A.F.C. meeting—Booth 35

HALL-SCOTT ENGINES *give you* FAST STARTS AND *DEPENDABLE* POWER

A testimonial to the leadership of Hall-Scott engines: Over the years, the Fire Departments of the City and County of Los Angeles have put into use approximately 200 Hall-Scott engines.



"The Super Fire Chief"
Model 6156-FE



Only Hall-Scott among truck engines offers the overhead camshaft. It is one example of Hall-Scott attention to excellence. The overhead camshaft has many advantages . . . most important, simple maintenance. It allows the entire head to be removed easily; valves may be ground right on the bench.

* Hall-Scott engines attack fast. Their torque charts show superb acceleration characteristics.

These engines with their long life are precision built to fire chief specifications. And they overhaul simply and economically.

For pulling or pumping, there is a Hall-Scott engine for your particular fire fighting requirements. Models range from 252 to 324 in honest horsepower; 750 to 2500 in guaranteed G.P.M.

Full details furnished gladly for specifying Hall-Scott for your new equipment or for engine replacement. Write the factory today for specifications and the name of your nearest dealer.

Perfection in packaged power

Hall-Scott
INCORPORATED

POWER DIVISION
2850 SEVENTH STREET • BERKELEY 10, CALIFORNIA

You can bet a fireman designed this pump!

From harness to shut-off nozzle, the Dragon Fire Pump is designed from the firefighter's point of view . . . has *everything* he wants in a back-pack pump. And it boosts his efficiency by cutting down fatigue.

The special Dragon harness is easy to get into and designed so the pump rides high on the fireman's back where it can't throw him off balance or interfere with walking or climbing. Just a few easy strokes of the pump lever gives the operator a *continuous* flow of water he can direct right where it does the most good. And a mere twist of the shut-off nozzle gives either solid stream or spray *instantly*.

Here's another advantage the firefighter appreciates! When he's using a Dragon Fire Pump, he can take his hands off both shut-off nozzle and pump lever to use rake, shovel, or other tool.

A Dragon Fire Pump comes *completely assembled* and requires little maintenance. There is no pump packing to dry out: even after standing idle for long periods, the pump is ready for instant use.

PARCO PRODUCTS COMPANY

PENNSBURG, PENNSYLVANIA

Dragon **FIRE PUMPS**

now available in 2 models

No. 150-S—Stainless Steel Tank

No. 150-G — Galvanized Tank: Cold-rolled steel, hot-dipped galvanized after fabrication.

All units equipped with brass pumps; all tanks seam welded. Capacity 5 gallons

DRAGON FIRE PUMPS meet Underwriters' Laboratories requirements and can be supplied with the UL label of inspection attached.

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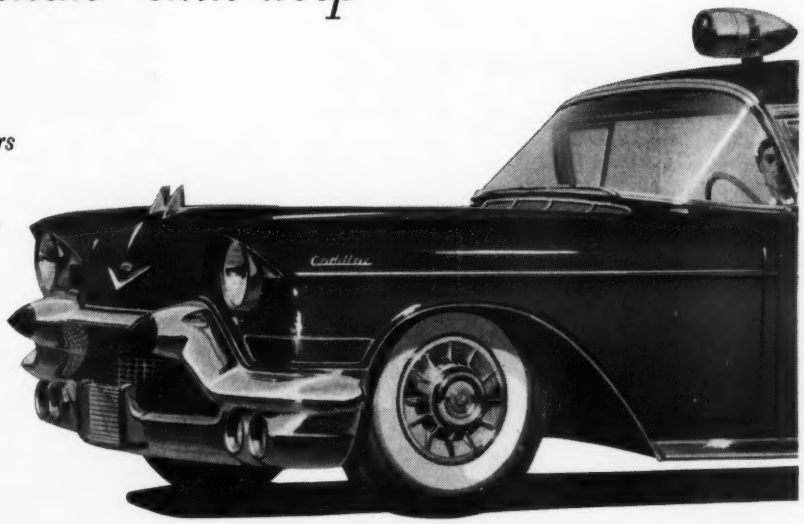
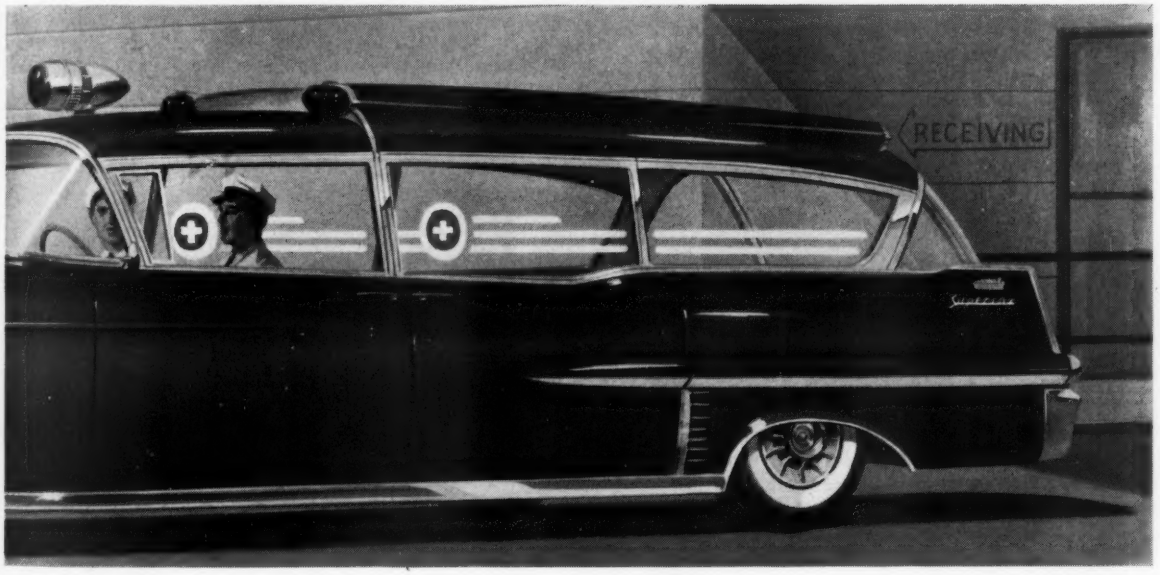
that's more than "skin deep"

Superior 1957
Ambulances and Rescuers
are as safe
as they are beautiful . . .

designed for
security, efficiency,
and patient-comfort
to match their surging
Cadillac power





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- all-steel, welded construction
- one-piece, die-stamped roof
- low loading height smooths patient transfer
- three headroom heights for full work area
- all auxiliary equipment, including oxygen
- Fold-N-Floor foam-cushioned attendant seats
- Superior's traditional fine craftsmanship
- See them now!

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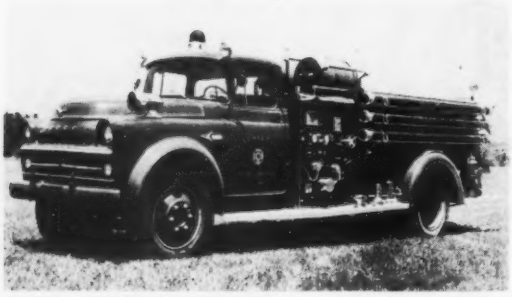
1957

SUPERIOR COACH CORPORATION • LIMA, OHIO



A 500 GPM Pumper, 500 Gal. Removable Water Tank, Built-in Rockwood Foam-Wet Water Proportioner, Dodge K8-D700 Chassis.

Delivered to Lafayette, La.

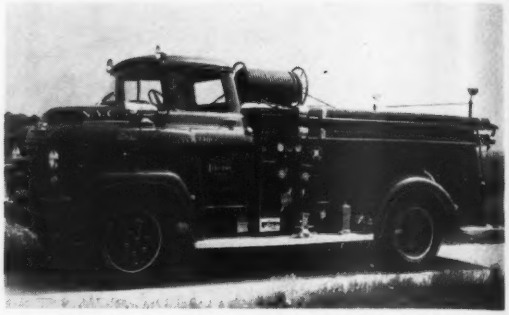
A 750 GPM Pumper, 600 Gal. Removable Water Tank, Special Compartments Over Pump Opening From The Top. International R1856 Chassis.

Delivered to Pleasantville, N. J.

A 750 GPM Pumper, 500 Gal. Removable Water Tank, Catwalk Side Compartments, Enclosed Comp. Over Pump. Ford F-800 Chassis.

Delivered to Columbus, Nebr.

Rear View Showing One Series of our Compartments, Large Center For Portable Pump With Quick Release Connections to Water Tank and Reel.



A 500 GPM Industrial Pumper, 500 Gal. Removable Water Tank, Short Wheelbase for sharp corners. GMC F352 Chassis.

Delivered to New York Central R.R.

A 750 GPM Pumper-Tanker, 1000 Gal. Removable Water Tank, with Removable Maintenance Plates on top. Diamond T636 Chassis.

Delivered to Marlton, N. J.

A 1000 GPM Pumper, Quad. Shown with a full Complement of Ladders, 400 Gal. Removable Water Tank. Boyer Custom Chassis.

Delivered to Sycamore, Ill.

EXCLUSIVE USE OF THE FAMOUS "HALE PUMPS" MORE THAN CAPABLE OF PRODUCING FIRE FIGHTING FOG

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BOYER FIRE TRUCKS

Built by **UNIVERSAL**

FIRE APPARATUS CORP.

Logansport, Indiana

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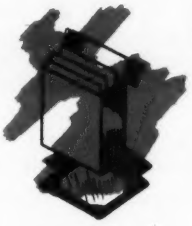
make every FIREHOUSE a FIRE SCHOOL

With a VISUAL CAST projector, used in any lighted space, our newly developed series of transparencies are fast replacing antiquated methods of teaching in the fire profession. Every transparency is based on the advice and general supervision of the best professional talent in the field of firefighting instruction. This new and scientific training method is being used by the top fire departments in the nation to insure their men uniform, effective training in modern firemanship.

FOR ALL SIZE FIRE DEPARTMENTS

Suitable for any size group, from a volunteer squad to the largest fire company. Any plain painted wall can serve as a screen.



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Basic (Structural) Firefighting. Aircraft Firefighting and Rescue. Fire Department Pumps. Effective Streams. Indirect Method of Extinguishing Interior Fire. Radio Communications.

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Fire Prevention Inspection. Fire Department Rescue Methods. Automatic Sprinkler Systems. Forest Fire Fighting. First Aid.

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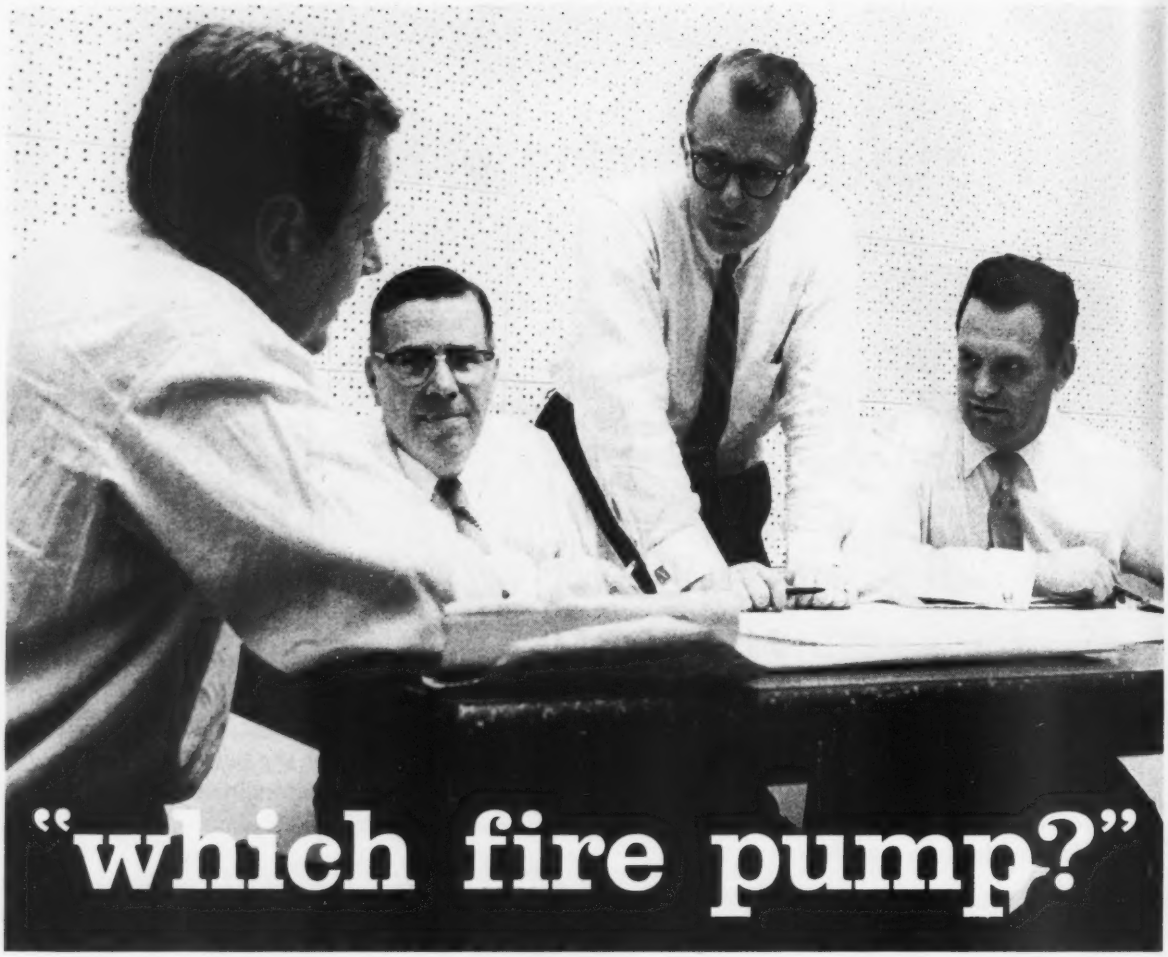
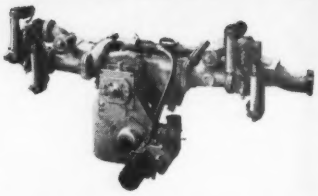
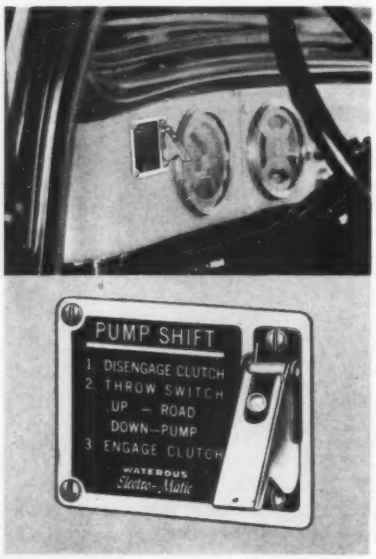


"which fire pump?"

This civic group wants dependability, low maintenance, and ease of operation; they'll choose the WATEROUS Electro-Matic* with push-button controls.





The WATEROUS *Electro-Matic* fire pump meets these requirements with a large plus! Completely automatic controls mean quicker, safer pumping. Completely new and thoroughly proven, this pump is outstanding in performance. And there is the WATEROUS famous 2-piece, horizontally split casing with protected, oil lubricated ball-bearings. Quality—long life—dependability!

Fast "in cab" shift—The Electro-Matic shift control is located on the instrument panel. Pump shift is actuated by flipping this switch *without leaving the driver's seat.* Convenient, fast, dependable—precious seconds saved.

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Department 307

WATEROUS *Electro-Matic*

80 E. Fillmore Ave., St. Paul, Minnesota

*Registration applied for.

See the WATEROUS exhibition booth (#95) at the International Association of Fire Chiefs' convention, New Orleans, Sept. 8-12, 1957.

Natecs gives SAFE clearance of intersections . . .

even protects against collisions of two emergency vehicles

In the NATECS system, a receiver mounted on the traffic signal at the intersection picks up a beam from a transmitter mounted on the approaching vehicle. Traffic lights automatically set on the emergency pattern. Then a *white* light turns on, *assuring* the emergency-vehicle driver that the intersection is clear.

If *two* signals are received at an intersection from emergency vehicles approaching from different directions, the white light facing the *second* vehicle flashes on and off, warning that another vehicle has priority.

Operation on radar frequencies permits a *narrow* beam that won't affect any signals but those directly ahead (up to ¼ mile) of the emergency vehicle. Completely automatic. No need to flip a switch as the vehicle changes direction. And after the vehicle passes the intersection, traffic lights automatically revert to normal sequence.

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Municipal Division
Moline, Illinois

Eagle equipment saves lives . . . saves time

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Municipal Division, Dept. FE-857
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Please send complete information on Eagle's new emergency traffic control system.

NAME AND TITLE _____

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ELECTRONICS takes over!

BATRONIC RESUSCITATOR
C.S.A. approved

. . . **POLICE**

. . . **FIRE**

. . . **POOLS**

This revolutionary technique—a product of modern science in this Electronic Age—has brought many comments from leading departments; the following are two:

"We have found the unit highly satisfactory and do not hesitate to give permission to list this department as one of the users of your BATRONIC Resuscitator."

"Although we have had this piece of equipment a short time, we have, several times, operated it and were amazed with the effects from its application."

You owe it to yourself, and to the people of the community you serve, to see this unit in action, and then compare with all other methods and types. It can be truly said that here, only, is the first real advancement in the field of breathing equipment that has occurred in many long years.

When the emergency call comes through—answer it with the unit that offers the most!

Sales Representatives:

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M & W Associates, Providence, Rhode Island
Universal Safety & Fire Company, Salt Lake City, Utah
James Fenton, Madison, Wisconsin
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Among Organizations that have installed BATRONIC Units are:

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City of Detroit (Mich.) Fire Department
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City of Montreal (Canada) Fire Department
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Cumberland (R. I.) C. D. Rescue Unit
Corinth Emergency Squad (N. Y.)
East Providence (R. I.) High School Pool
Park View (Cranston, R. I.) High School Pool
Gladstone (Cranston, R. I.) High School Pool
Bellmore (L. I., N. Y.) Fire Department
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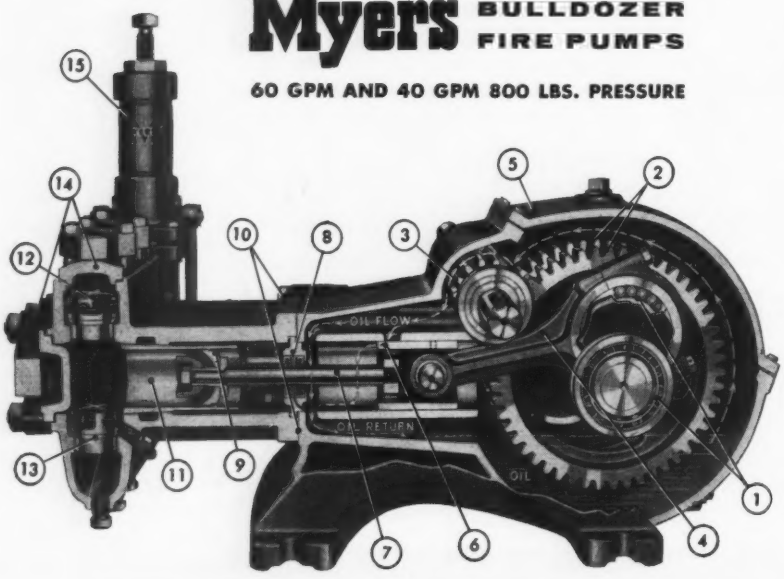
BUILDERS OF SERVICE, CRASH AND LADDER TRUCKS • VOLUME AND HIGH-PRESSURE PUMPERS • SQUAD AND EMERGENCY CARS • STORAGE TANKS

Built by Myers for PRESSURE!

Myers BULLDOZER FIRE PUMPS

60 GPM AND 40 GPM 800 LBS. PRESSURE



See Numbered Cutaway Drawing

Manufacturers of fire-fighting equipment—and fire chiefs alike—specify Myers Giant Bulldozer fire pumps to deliver the dependable pressure required for vital high-velocity stream or cooling fog. Built by Myers and backed by nearly 80 years of pump engineering know-how, the Giant Bulldozer is designed to withstand the severe strain and hard service required of pumps operated under high pressures. Check these quality features one by one:

1. ROLLER BEARINGS—Throughout with hardened-steel wearing surfaces.

2. LARGE DOUBLE MAIN GEARS—Eliminate side thrust, strains, stresses and breakage. Friction, wear and loss of power are reduced to a minimum. Quiet, smooth, efficient and economical operation.

3. PINIONS—Flame-hardened steel, cut integral with the Shaft—no keys to wear or loosen.

4. CONNECTING LINKS—Extra long, move directly in line with the cylinders. Have oversize wrist pins with removable bronze bushings. Large roller bearings reduce friction and power loss to a minimum.

5. GEAR CASE—Dust, dirt and drip proof. Working parts removable without draining oil.

6. CROSSHEADS—Large diameter and extra long. Keep plungers centered in cylinders—cups wear evenly, last longer.

7. PISTON RODS—Stainless steel, accurately centered and securely fastened into crossheads.

8. WATER AND OIL SEALS—To prevent water from entering and oil from leaving gear or oil chamber.

9. PLUNGERS—Rubber and fabric cups—easily replaced at low cost.

10. WATER END—Flanged and bolted to gear case—no long bolts to stretch and loosen.

11. CYLINDERS—Heavy-steel shell with smooth, wear-resisting, non-corroding, porcelain lining. Patented. Tapered fit—no packing required. Easily removed and replaced.

12. FLAT VALVES—Patented. Spring loaded, disc type. Stainless steel disc, seat and spring. Fast and positive seating.

13. VALVE SEATS—Hardened stainless steel, tapered, no gaskets—less corrosion, less wear, more efficient.

14. VALVE AND CYLINDER CAPS—Have recessed gaskets and are held by bolted clamps. Can be quickly and easily removed.

15. PRESSURE REGULATOR—Diaphragm type. Fast, positive Flat Disc Valve.

CRANKSHAFT—Forged Steel Precision machined for extremely accurate tolerances. Heat treated and carefully balanced.

FREE

For complete details write for a free catalog section covering the full line of Myers fire pumps, high-pressure guns and fog nozzles. Send coupon to: The F. E. Myers & Bro. Co., Ashland, Ohio.

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Myers PUMPS

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THE F. E. MYERS & BRO. CO.
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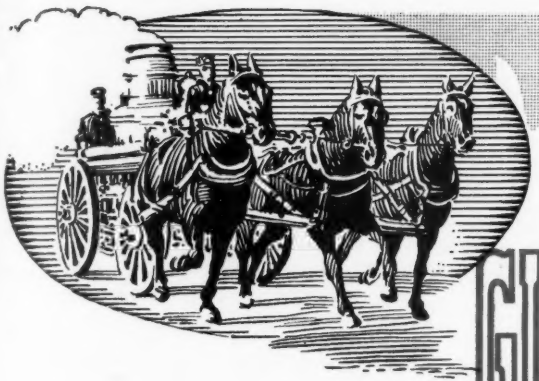

LEADERS FOR OVER 56 YEARS . . .
SUITS FOR FIRE CHIEFS AND FIREMEN

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Since 1901

Proven in use throughout the world for the last 56 years, the GLOBE SUIT is standard for maximum protection, and really needs no introduction at all. Every garment is absolutely guaranteed to give years of dependable service. This guarantee we make unconditionally because we know that Globe Suits have proven outstanding in tough fire service.

GLOBE SUITS are made from only the toughest, stoutest fabrics . . . yet they are light, flexible, waterproof* and comfortable. They are designed and constructed for your safety in action.

**Interlinings made with 100% DuPont Neoprene.*

in Black
Brown
White
Red
Blue
or Olive Drab

See them at your dealer's or write for our catalog.

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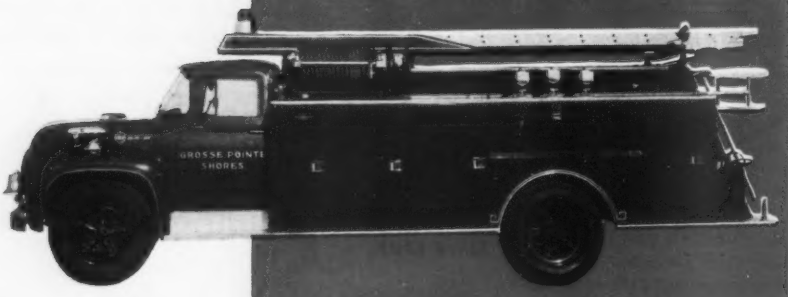
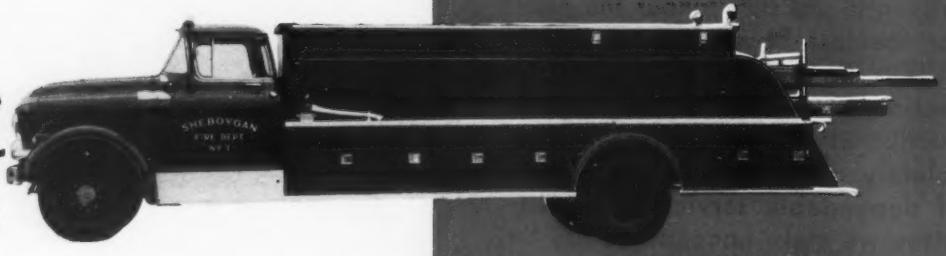
GLOBE MANUFACTURING COMPANY PITTSFIELD, NEW HAMPSHIRE

All Types Pumpers 100 G.P.M. to 1500 G.P.M.



City Service Ladder Trucks



Trucks For Industrial Plants

Also Water Tankers 1000 to 1500 Gallon Capacities

to all FIRE CHIEFS

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for quotation and specifications
on your
fire truck, hose and
equipment requirements

FIRE MASTER CORPORATION

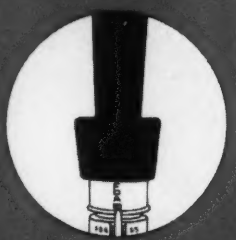
36100 Harper Ave.
Mt. Clemens, Mich.

1 IN ONE NOZZLE

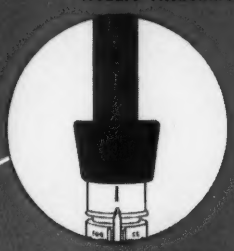
ELKHART'S NEW "F" Series Select-O-Stream MYSTERY NOZZLE you get FOG FOAM

(Patent Pending)
L-200 SOS-F

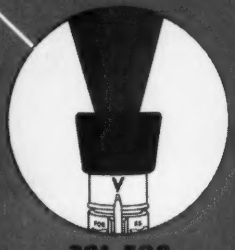
PLUS ALL THESE



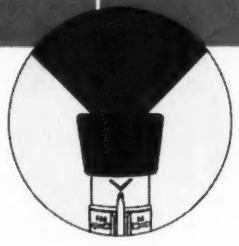
FOG FOAM
No Extra Nozzle Attachments



STRAIGHT STREAM



30° FOG



PROTECTIVE WATER CURTAIN

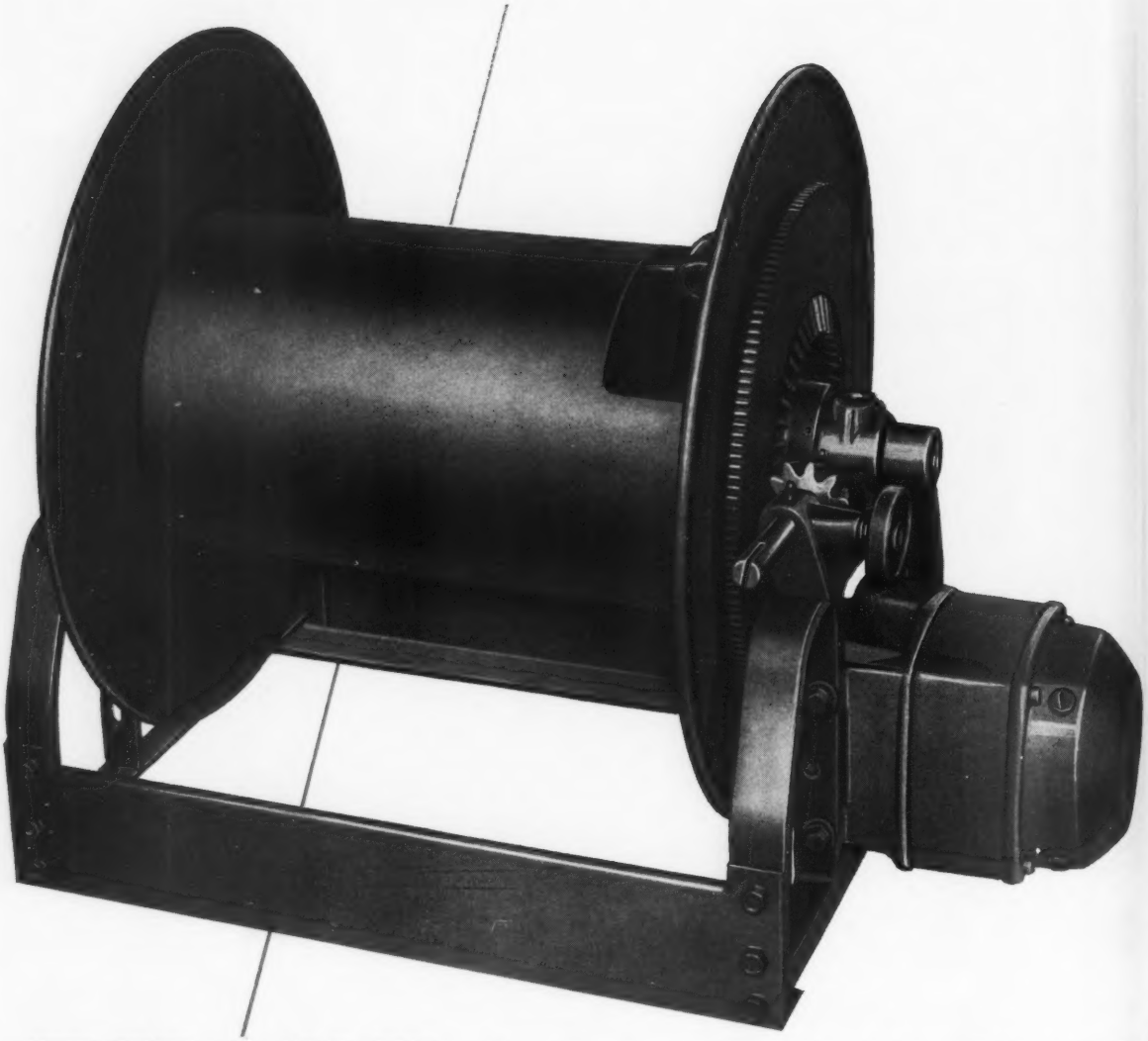
"F" Series Select-O-Stream MYSTERY NOZZLE

Now... you can select FOG FOAM on the "F" Series Select-O-Stream Mystery Nozzle in the same quick way you choose Straight Stream, 30° Fog, Protective Water Curtain or any degree of stream in between. Fog Foam is a built-in selection feature of Elkhart's "F" Series Select-O-Stream Mystery Nozzle. *No extra nozzle attachments.* Remember — Elkhart Select-O-Stream gives you more!

"F" Series Select-O-Stream Mystery Nozzles are available from 1" through all sizes including our large 2500 gallon Jumbo King Mystery Nozzle.

ELKHART BRASS MFG. CO., Inc.

MORE THAN HALF A CENTURY OF FIRE FIGHTING PROGRESS — ELKHART, INDIANA



THANK YOU

Your increasing preference for Ardmore Reels is deeply gratifying to us. For we spare no effort to build into these better reels the swift, smooth, sure performance modern fire-fighting demands.

Ardmore Fire-Fighting Reels are now available in explosion-proof, starter-motor, and hand-wind models...single or dual ...with or without hose rollers. All models are competitively priced. Complete catalog on request. Write, wire or phone:

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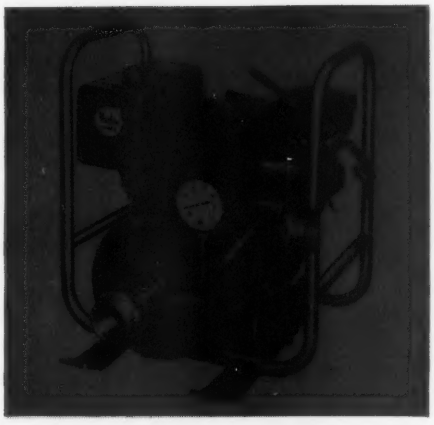

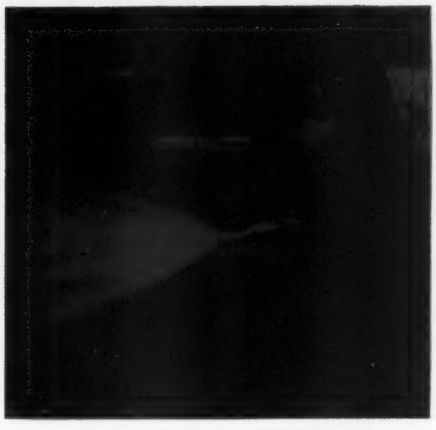

Dependable Fire Fighting with MARLOW PUMPS

With a supply of surface water, a stream or pond, this portable pump becomes an efficient and light-weight fire fighter. Powered by a dependable four-cycle gasoline engine, it primes itself and starts pumping only 15 to 30 seconds after starting. Highly portable, the Marlow Fire Pump can be placed in a car trunk or jeep and dispatched quickly in an emergency. Because it is easily carried, the pump can be moved to remote areas that a pumper can't reach. On location, it is equally useful for either fire fighting or booster service.

Marlow Fire Pumps provide dependable protection for municipalities, industrial plants, and farms. It is indispensable to Fire Departments. This pump was engineered specifically for the job and has many outstanding features . . .

Exhaust primer — primes pump in 15 to 30 seconds, easily accessible to pump operator.

Lightweight — ribbed aluminum construction withstands high pressures, making readily portable unit. Weighs only 160 pounds with gas and oil, ready to operate.

Compact design—easily placed in small compartments or spaces on any pumper as well as in car trunks, jeeps, or pickups.

Welded-steel runner-type base — makes a rigid mount that can be easily lifted or skidded.

Combination vacuum and pressure gauge — when priming, shows operator whether or not there are leaks in suction hose. When pumping, allows operator to adjust pressure to individual operating conditions.

Dependable four-cycle engine — assures easy quick starting, unattended operation.

Shielded spark plug connection — prevents ignition failure from wet weather or spray.

Protective handles — Wrap around engine and pump and protect vulnerable parts. Handles are extra strong and are placed for convenient carrying.

Remote throttle — mounted on top of engine for easy operation.

Mechanical shaft seal — long-lived, rugged and requires no adjustment.

Automatic check valve — seals off discharge while priming, swings out of way when pumping starts, no hand valve to manipulate.

Fog or foam operation — over 100 pounds pressure available for low pressure fog or foam operation.

For details, literature, or application data, see your Marlow dealer today or write direct for Bulletin F-04.

Marlow PUMPS

6-227

DIVISION OF

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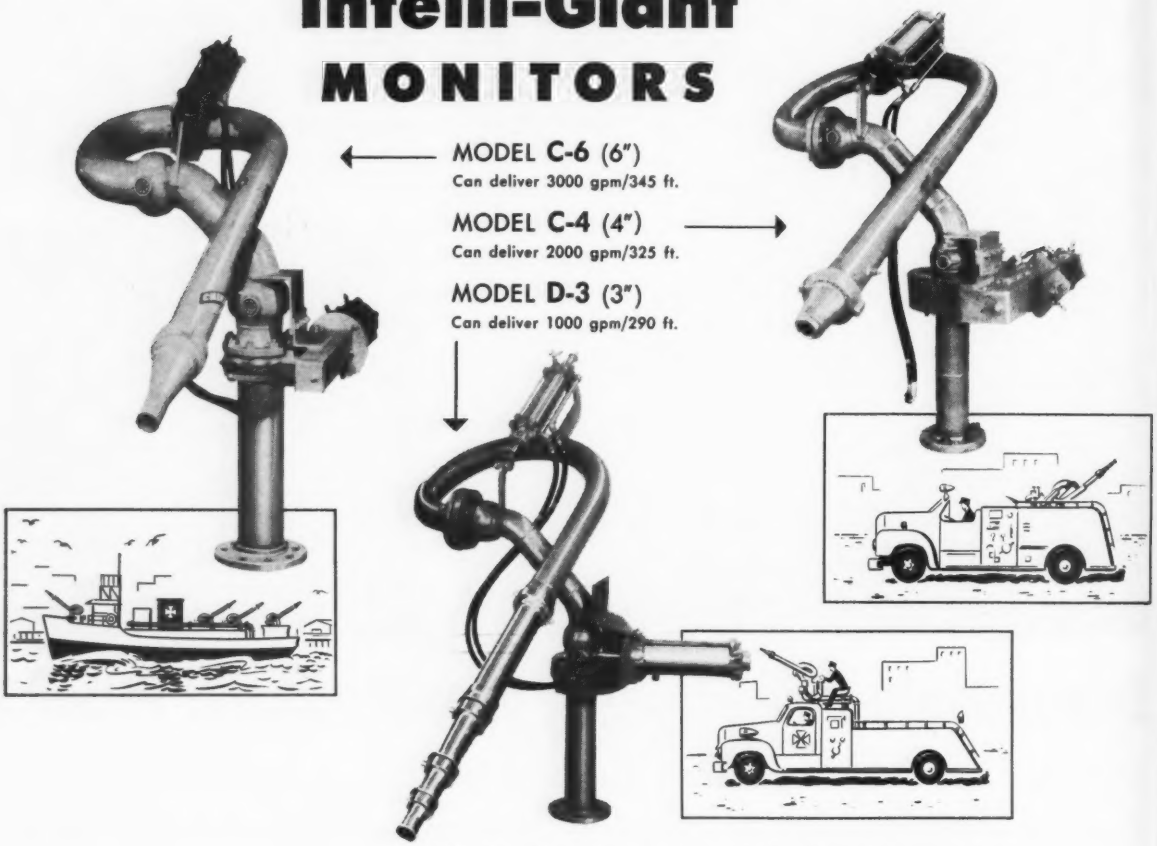
NOW... CHIKSAN OFFERS YOU A COMPLETE LINE OF MASTER STREAM

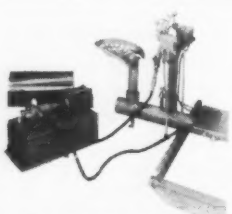
Intelli-Giant MONITORS



MODEL **C-6** (6")
Can deliver 3000 gpm/345 ft.

MODEL **C-4** (4")
Can deliver 2000 gpm/325 ft.

MODEL **D-3** (3")
Can deliver 1000 gpm/290 ft.



Hydraulic controls can draw power from source of stream, or a closed circuit system is available for operation in cold climates.

Whether fire suppression tactics dictate a powerful far-reaching master stream or a dense enveloping fog, there's a Chiksan Intelli-Giant with the proper capacity to meet individual requirements. Hydraulically controlled, these "giant deluge" monitors can be truck mounted for mobile use or situated as a fixed emplacement in hazardous areas with remote controls located at a safe vantage point. A closed circuit hydraulic system is available for operation in cold climates. Direction of monitor is controlled by two simple-to-operate levers. With all of its powerful striking force and high volume output, the savings achieved from effective suppression of just one fire can more than repay the cost of this monitor. Send for literature and prices today.

See "MODERN FIREFIGHTING". Write Chiksan, 300 No. Pomona Ave, Brea, California, to arrange a showing of this informative 16 mm movie.

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HAS DESIGNED AND ENGINEERED THIS ENTIRELY NEW SERIES OF "**ROCKET**" AND "**ATOMIC ROCKET**" SIRENS, SPECIFICALLY, TO MEET MODERN REQUIREMENTS FOR HIGHER PERFORMANCE AND GREATER VOLUME ON ALL TYPES OF FIRE APPARATUS.

NO. 194 "REVOLVO-RAY"

"**SIRENO'S**" COMPLETE LINE OF 360° "**REVOLVO RAY**" ROTATING WARNING LIGHTS ASSURES COMPLETE VISUAL PROTECTION FOR FIREMEN AND EQUIPMENT.

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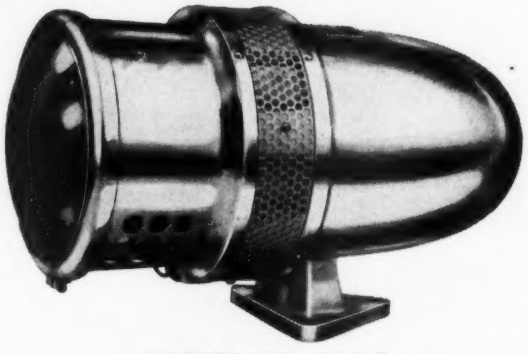

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OVER 47 YEARS OF RESEARCH AND MANUFACTURING EXPERIENCE ASSURES YOU OF QUALITY AND SERVICE.

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PLEASE ENTER OUR DEPARTMENT ON YOUR CURRENT MAILING LIST AND SEND ***FREE*** CATALOGS ON "SIRENO" SIRENS AND "REVOLVO RAY" WARNING LIGHTS:

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SAFETY is First

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FIRE EXTINGUISHERS

NUMERALS certify that this cylinder is spun from seamless steel, manufactured and tested under rigid ICC specifications.

Each SAFE-T-METER extinguisher body is of this one-piece construction, capable of holding pressures far *in excess of normal use*. This valve assembly, also, is equipped with a gauge guard and an approved safety pressure relief device as added safeguards.

SAFETY FIRST believes in its obligation to provide that "extra" margin of protection to the user, assurance that he has a superior product of maximum strength and safety.

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Approved by Factory Mutuals, Underwriters Laboratories, Inc.

Write for details to:

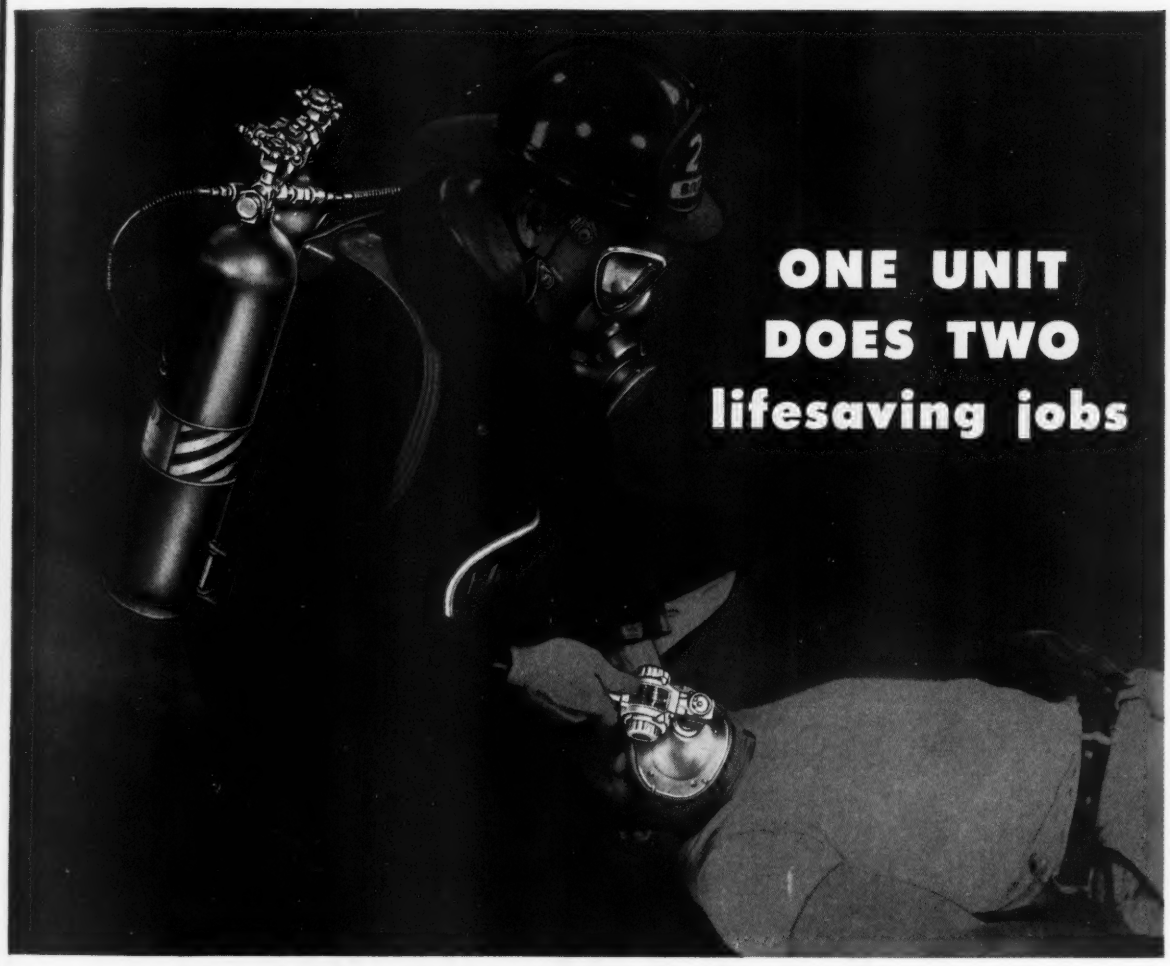
DEALER APPOINTMENTS OPEN to sell Safety First equipment on a protected basis and to service present equipment now in your territory.

SAFETY FIRST PRODUCTS CORPORATION

ELMSFORD, NEW YORK

Manufacturers of Safe-T-meter *Pressurized Fire Equipment*

now—the first of its kind!



AIR or oxygen MASK AND PORTABLE RESUSCITATOR COMBINATION!

It is **no longer** necessary to buy a protective mask and a resuscitator separately. This unit will allow you to treat any case of asphyxia with the most efficient **resuscitator** known. Used as **an air or oxygen mask** it will protect the wearer in any toxic or oxygen deficient atmosphere. For rescue purposes you can rely on this versatile unit to perform both duties at the same time. Get double the value with this amazing new air/oxygen mask and portable resuscitator combination. **Don't wait** . . . clip and mail **today,** for demonstration or information.

* See this amazing combination in the Fyr-Fyter Booth, at the International Assoc. of Fire Chiefs Convention in September, or the National Safety Congress in October.

GLOBE

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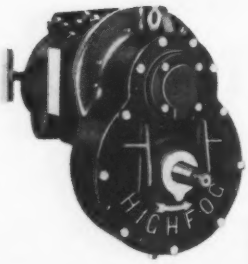
NAME_____ ADDRESS_____ CITY, STATE_____

Keeping Ahead with HIGH FOG



Los Angeles County Fire Department under the direction of Keith E. Klinger, Chief Engineer, is recognized as one of the country's most progressive departments. The territory which it serves encompasses 2252 square miles. Within this area is included one of the nation's fastest growing industrial districts, a large number of airports and the world's most valuable watershed. A diversity of area requires versatile equipment which can serve many purposes.

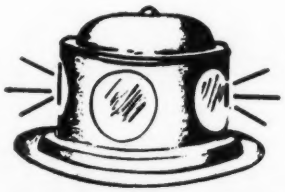
Having incorporated high pressure as one of its modern fire fighting methods, Los Angeles County naturally chose High Fog. High Fog Pumps are versatile. They provide pressures up to 1000 PSI or volume to 150 GPM and can be installed on any type of fire apparatus.

High Fog Pump is proud to be included with the other fine equipment that has helped to establish Los Angeles County's excellent reputation for fire protection.

Large and small departments from coast to coast are specifying High Fog to fill their needs for both new and existing equipment. For complete specifications and the name of your nearest dealer, write High Fog Pump Company, 225 Rosemead Blvd., Pasadena, California.

high fog pump COMPANY
PASADENA, CALIFORNIA

WARNING LIGHTS—VEHICLE TYPE —ALL AROUND NAVAL LENS



"CIRCLE BEAM" VEHICLE LIGHT— TWO STYLES—MECHANICAL ROTATION OR ELECTRO-MAGNETIC PULSE TYPE

SEALED BEAM WARNING LIGHTS— WITH GREATEST EFFECTIVENESS, LEAST BATTERY DEMAND AND PROPERLY SPREAD BEAM.

"SUPER-ELEC FLASH" HIGH POWER TRAFFIC CONTROL STANCHION—VISIBLE DAY AND NIGHT, RUNS ON FLASHLIGHT BATTERIES, AN EXCELLENT FIRE AREA BLOCKADE.

ENGINEERED LIGHTING FOR FIRE FIGHTING

Supposing you could have a lighting electronic laboratory devoted to your problems. There, skilled engineers would evaluate even the human responses to various types of signals and investigate all the facets of your problems.

Such a facility is available to you. The Air Force, Army and Navy and largest utilities use it. Its effectiveness is proven in McDermott Products designed to "Save Lives With Light."

Each light is designed to fully meet the basic requirements established and to give the maximum protection.

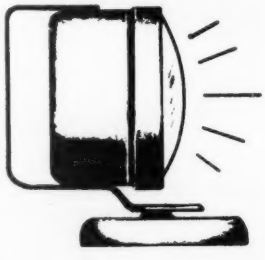
If you want the best, buy and specify a McDermott light the next time you are in the market. Write for data sheets.

Julian A. McDermott Corp.

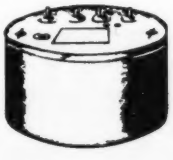
1639 Stephen St., Ridgewood, Queens L. I., N. Y.
P. O. Address—Brooklyn 27, N. Y.

"ELEC-FLASH" CONE MOUNTED TRAFFIC WARNING LIGHT. RUNS 24 HOURS ON 4 FLASHLIGHT BATTERIES—SIMPLE, EFFECTIVE, ECONOMICAL.

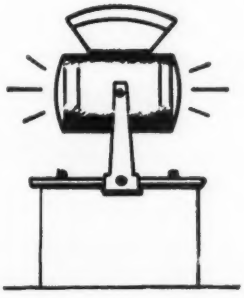
ELECTRO MAGNETIC DETACHABLE POWERFUL VEHICLE WARNING LIGHT WITH SPECIAL SEALED BEAM. "THE FASTER YOU DRIVE THE HARDER IT HOLDS."

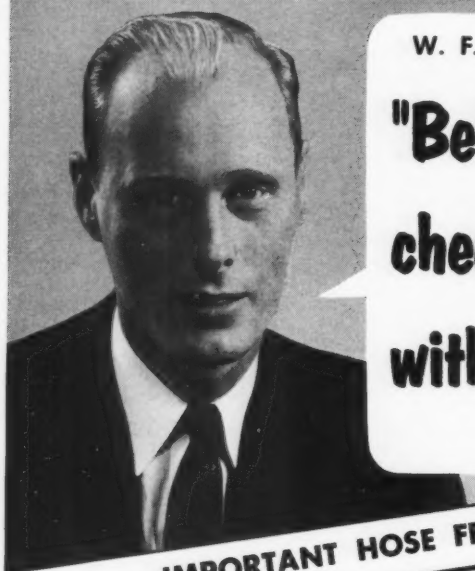


"MULTI-PULSE FLASHERS" — CONTROL ALL THE LIGHTS ON A TRUCK FLASHING ALTERNATELY, LEAST BATTERY DRAIN — LEAST MAINTENANCE.



PORTABLE UTILITY LIGHT— MAXIMUM EFFICIENCY, EASE OF HANDLING, QUICK BATTERY CHANGING, DUAL WORK AND WARNING FUNCTIONS.





W. F. ANDERSON, BOSTON Hose Sales Mgr., says:

"Before you buy fire hose... check BOSTON'S advantages with any other hose!"

IMPORTANT HOSE FEATURES	BOSTON Fire Hose	Other Mfrs. Fire Hose
1 A hose for every fire fighting need from a proven, reliable source.	✓	
2 Single responsibility — couplings and fittings custom-made by same company that manufactures the hose.	✓	
3 Made by the originators of circular woven fire hose — with over 75 years of experience.	✓	
4 Seamless tube of highest quality rubber for longest service life and least water absorption.	✓	
5 DACRON filler for lightness, extra strength, superior flexibility.	✓	
6 Longer service life under most severe conditions.	✓	
7 Every length pressure tested prior to shipment.	✓	
8 Maximum protection against mildew, rot, and freezing.	✓	
9 Compact . . . coils easily and dries quickly.	✓	
10 Fast, personalized service from warehouses throughout the United States.	✓	

Only BOSTON offers EVERY important feature

See your BOSTON agent or write to BOSTON for free descriptive literature

BOSTON FIRE HOSE

BOSTON WOVEN HOSE & RUBBER COMPANY
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Also producers of INDUSTRIAL HOSE • BELTING • V-BELTS • MATTING • PACKING • TAPE

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THE FINEST
IN FIRE
FIGHTING
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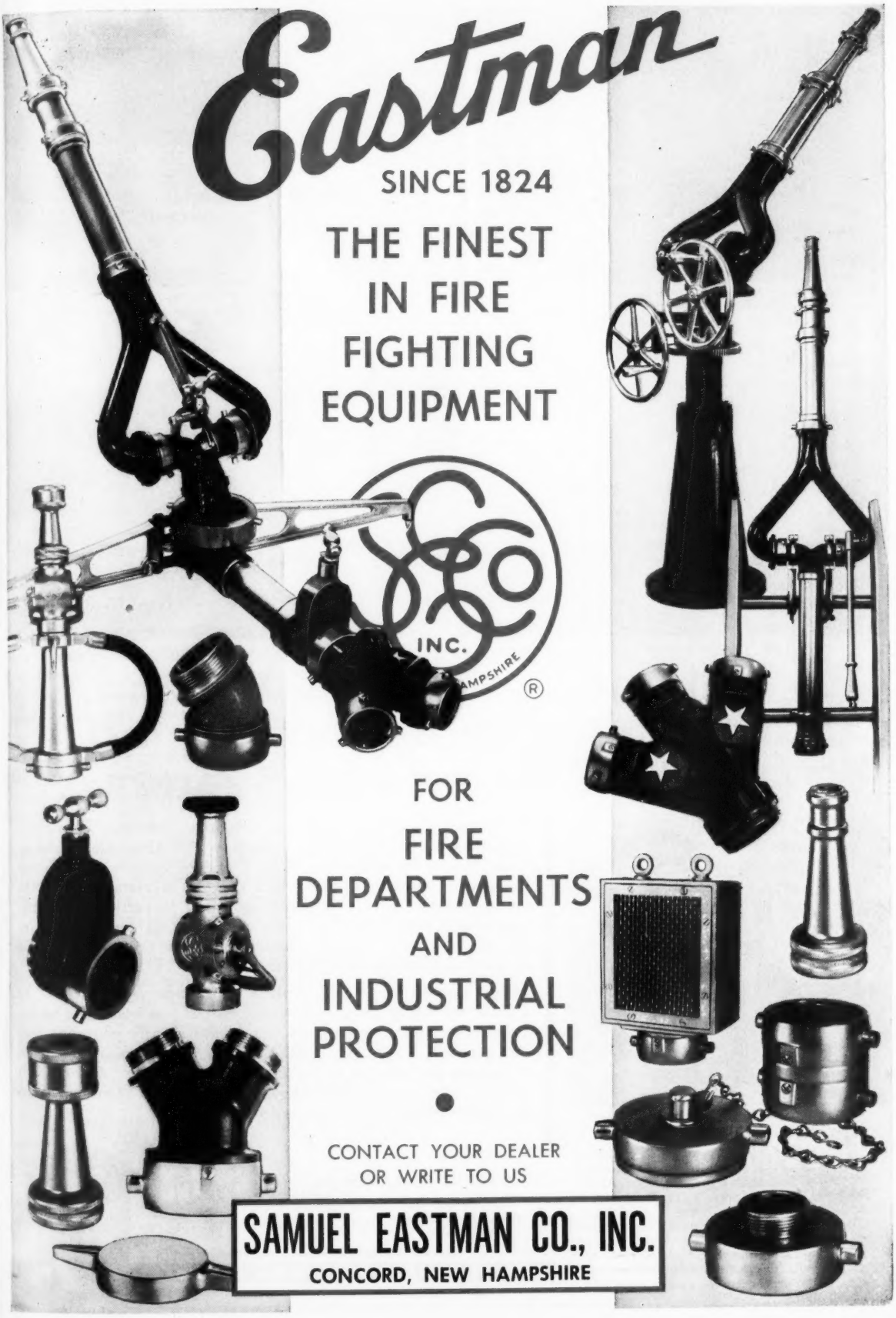

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FIRE
DEPARTMENTS
AND
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CONTACT YOUR DEALER
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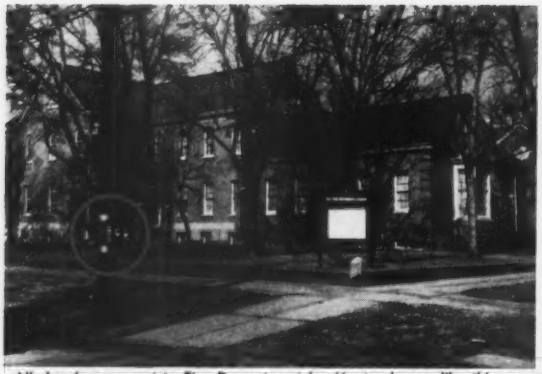
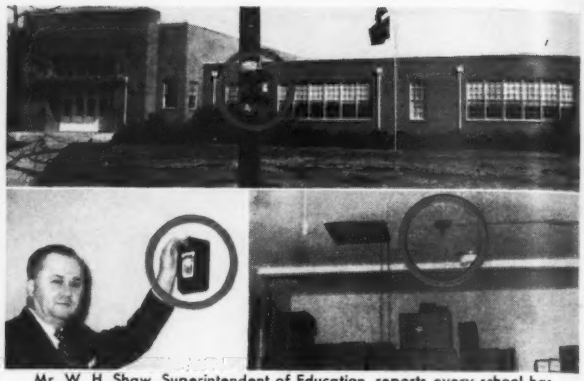
SAMUEL EASTMAN CO., INC.
CONCORD, NEW HAMPSHIRE



All churches connect to Fire Department by Master boxes, like this one. Interior has Sprinkler Watchman, Detectors and Non-Code Stations.



Mr. W. H. Shaw, Superintendent of Education, reports every school has total 24-hour protection with directly connected fire alarm systems.

The main street has three Master boxes plus two more — all within 3 blocks.

Columbus Officials Design Total Fire Protection Using Modern Gamewell System

FIRE FACTS **IN COLUMBUS:** Columbus fire protection is in the very able hands of this trio: Supt. of Alarm System, Tom Tillman; City Manager, J. A. Willman and Fire Chief T. C. Turner. They are shown in the new Police Headquarters and jail building which is protected by Detectors, non-code stations and alarm bell. Their responsibility covers a total of 27 square miles and a population of 135,000.

There are "no missing links" in Columbus, Georgia! Municipal management applies modern concepts in Fire Alarm Communications by using all the features of the Gamewell System to develop a completely integrated system which provides maximum protection for institutions, schools, churches, industrial properties, and commercial and public buildings. Over one-half of all the boxes in the city are Masters — directly connecting interior fire alarm systems to the Columbus Fire Department.

Direct Connection for Complete Protection is the theme in Columbus — why not make it yours, too? If you would like to develop this concept of fire alarm communications for your city, call on Gamewell. They offer a FREE Survey and technical assistance in helping you get the most for your money in Fire Alarms. Get started today—send for the "Quick Facts Checklist": **Conversation or Organization** . . . it will save you money.

THE GAMEWELL COMPANY
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FIRST WHEN SECONDS COUNT!

Manufacturers of precision electrical equipment since 1855

FIRE
ENGINEERING
THE JOURNAL OF THE FIRE PROTECTION PROFESSION SINCE 1877

VOL. 110, NO. 8 AUGUST, 1957

Progress Reported—But So Much to Be Done!

Looking back over the history of the fire service in the last 80 years we can report progress. Yes, in that time the fire service has come a long way. And so, too —if you will permit us—has FIRE ENGINEERING.

Improvements in the entire range of fire protection and prevention have been consistent, if not spectacular. Our fire defenses are greater, more scientific, than ever before. Our personnel is of a high order—and better trained and equipped, for their own safety as well as that of the public than that of our forefathers. Our strategy and techniques of fire control and extinguishment would seem fantastic to the veteran fire fighter of a generation ago. And much the same thing may be said for our fire prevention methods; we can just picture an old veteran, top-whip at Engine —, sizing up today's radio field inspections!

This is positive progress. And it is supported by the fire department studies and surveys of the National Board of Fire Underwriters and the various state rating bureaus.

Then why is it that we appear to be fighting a losing battle, generally, with fire? We never had so many big and costly blazes, so many disasters! And we are continuing to lose precious lives at a frightening rate.

Yes, much has been done. *But is it enough?* Right now at our present pace of living, with its chemical, electronic and nuclear developments, we are up against new products, new processes and new hazards for which we have little or no cure. Much remains to be done in improving our strategy and procedures to cope with these new and undreamed of dangers.

Can anyone truthfully say that our basic research into fire and explosions in all their terrifying ramifications is complete, and adequate? Can anyone testify that the fire service is now conditioned and prepared to cope with today's and tomorrow's serious problems growing out of our dizzily expanding economy, our shifting population and business and industrial centers?

Can anyone honestly say our fire forces are rightly located, staffed, officered and equipped to most effectively provide fire protection needed to hold fire losses to the irreducible minimum?

Is anyone bold enough to maintain that our national, state and local fire laws and ordinances are adequate? And does anyone consider the nation's fire forces are as prepared as they should be (with or without civil defense) against possible enemy attack, or for that matter, to face up to large-scale natural disasters?

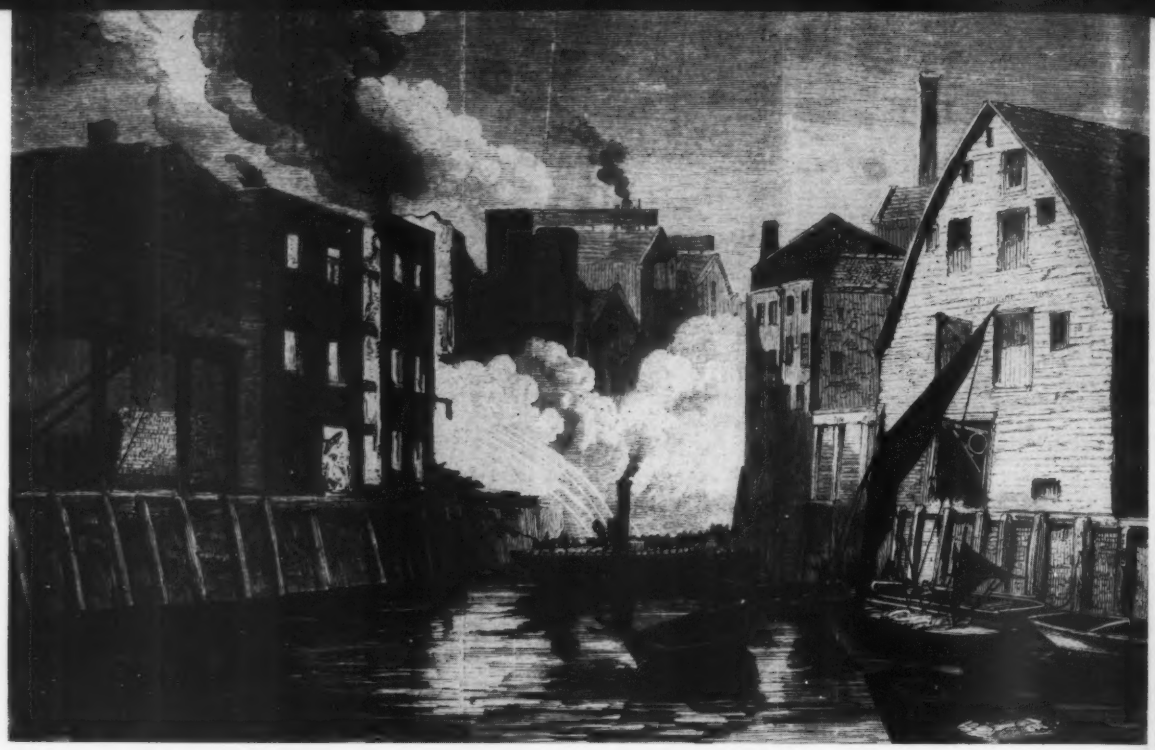
We could run the whole gamut—working conditions, wages and housing of fire fighters, methods of selecting and training personnel, of administering our fire departments, and ask of each truthfully, have we progressed in all these and related details as far and as fast as we should?

For 80 years, FIRE ENGINEERING has chronicled the forward progress of the American fire service—at the same time attempting to give our readers the plain facts of the tasks, trials and tribulations that lie ahead. Together with the fire service, FIRE ENGINEERING has weathered wars and depressions. Throughout it all, the editorial policy has been concerned with just one question: Is it best for the fire service?

This *1957 IAFC Conference and Buyers' Guide number,* the largest and we believe, the most important in that 80-year history, epitomizes much of the splendid progress made and tells something of the tremendous tasks that lie ahead.

Roi B. Woolley

Editor



The history of fireboats begins with the first steam floating engine, built in 1855 for the London Fire Brigade. This illustration is taken from "Fires and Fire Brigades," by Eyre M. Shaw and shows the floating engine at a fire on Meriton's Wharf, Dockhead, London in 1864

Log of the Nation's Fireboat Fleet

The author traces the progress made in marine fire fighters over the years. There have been many changes—and more in process

By CLARENCE E. MEEK

Honorary Battalion Chief, New York Fire Department
Librarian, Fire College

FLOATS CARRYING manually-operated fire engines were used both in Europe and the United States as far back as the early 19th Century, but because of incomplete records, we cannot make any positive statement as to which city was first to fight waterfront fires from the waterside with floating egines.

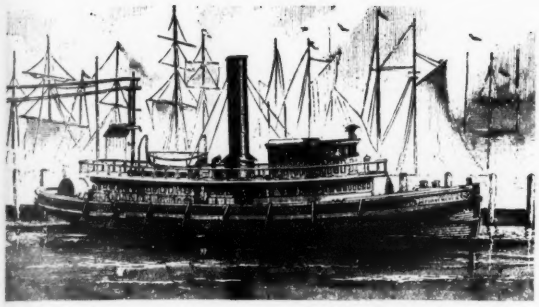
However, it has been established to the historian's satisfaction that London possessed the first steam fireboat, and inasmuch as this account is primarily concerned with the history of the power-operated "floating engines" we may well begin with a quotation from "Fires and Fire Brigades," by Eyre M. Shaw, late chief officer of the London Brigade: "Up to 1852 the appliances on the River Thames for extinguishing fires in the large warehouses on the banks consisted of two barges, each having on board a large fire engine worked by hand; one pumped by forty men and the other by sixty. In this year, steam power was used to work one of the engines, and this was the first introduction of steam into the London Fire Brigade. In 1855 a powerful steam floating engine was constructed and the manual floating engines were abandoned."

Soon after taking over the management of the New York Fire Department in 1865, and establishing the paid force, the Board of Metropolitan Fire Commissioners discussed the need for a "floating engine to fight fires on and along the river fronts." Their discussions resulted in the signing of a contract in 1866 with John C. Baxter & Son, owners of the salvage steamer *John Fuller*, for the services of the boat on a "call basis" at a yearly rental.

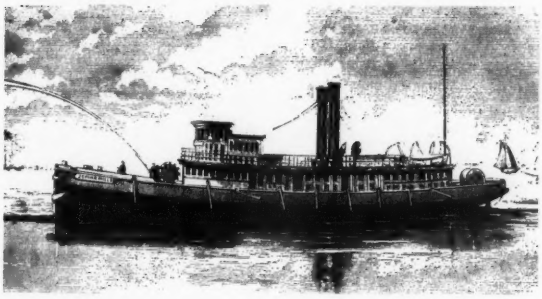
The *John Fuller* was equipped with fire pumps and hose, in addition to a variety of salvage gear, and was well suited for the role of the first American fireboat. The *Fuller* was advertised by her owners as a "wrecking and fire steamer," and a notice appearing in a journal of the period stated: "The pumps are of extra power and were made to order expressly for the *Fuller* by the Amoskeag Manufacturing Company. As a fire engine she throws thirteen streams of water."

The *Fuller* was to serve as a regular unit of the Fire Department of the City of New York for more than nine years, until the first city-owned fireboat was put in service in 1875, and for a number of years thereafter was rented from time to time to take the place of the city fireboats when they were out of service for inspection and repairs.

This narrative of the fireboats now becomes a story of specialized craft assigned exclusively to the fire service and operated by professional fire department personnel. On this basis, the era begins Januay 1, 1873, with the commissioning by the City of Boston of the *William*

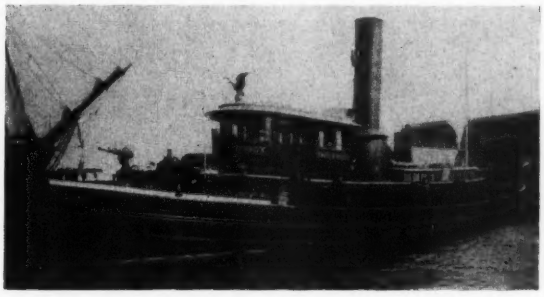


1875 The William F. Havemeyer, Engine 43, FDNY, was 106 feet overall by 22-foot beam by 10-foot draft; it discharged 6,000 gpm at 120 psi. Its crew lived aboard



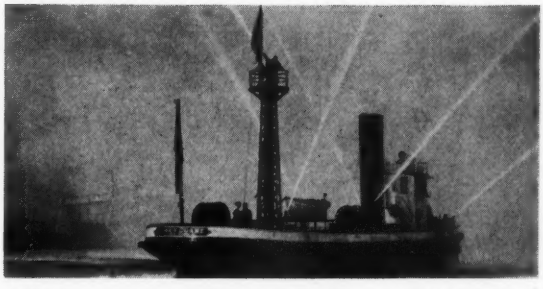
1882 The Zophar Mills, Engine 51, FDNY, was 120 feet overall by 25-foot beam by 10-foot draft; it discharged 6,000 gpm at 150 psi. Its crew lived aboard

1890 The New Yorker, Engine 57, FDNY, was 126 feet overall by 26-foot beam by 11½-foot draft; had triple expansion engines and reciprocating pumps discharging 15,300 gpm at 150 psi

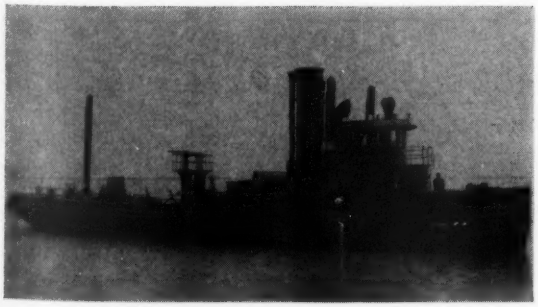


1893 The David A. Boody, Engine 32, Brooklyn, was 106 feet overall by 23-foot beam by 7-foot draft; it was capable of discharging 6,500 gpm at 120 psi

1895 Engine 44, Boston F.D., had wood hull 110 feet overall, 26-foot beam, 8½-foot draft; 6,000 gpm. This craft followed Engine 31 by a few years

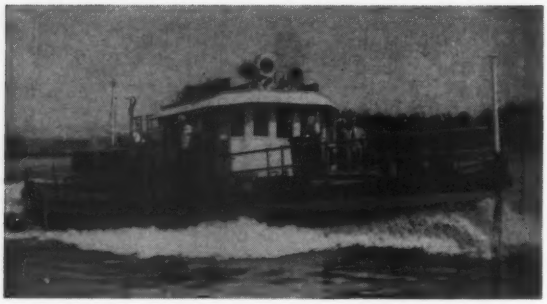


1908 The James Duane, Engine 85, FDNY, 131 feet overall, had 28-foot beam, 10½-foot draft; 9,000 gpm. It and its sister ship, the Thomas Willett, had first turbine-centrifugal pumps

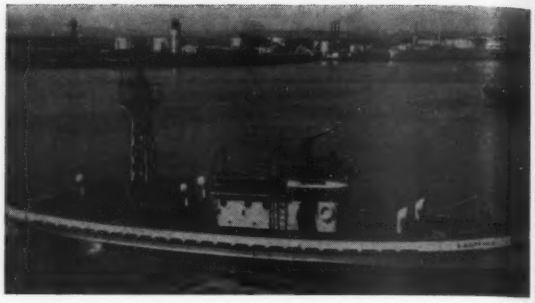


1913 The Graeme Stewart, Engine 37, Chicago F.D., was the first turbine-electric drive fireboat. Note spuds for anchoring craft against back pressure

1919 The Bill Kettner, San Diego F.D. 65 feet overall by 18-foot beam by 3-foot draft; 5,000 gpm. The first gasoline-driven fireboat, it was rebuilt and modified in 1950 (as pictured above)

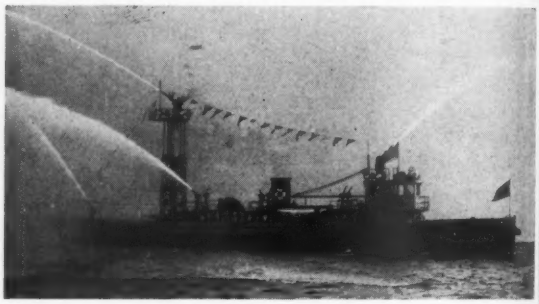


1925 The Mike Laudenklos, Portland, Ore., F.D., 85 feet overall by 20-foot beam by 5½-foot draft; 9,680 gpm at 200 psi. It is one of three gasoline-driven boats of same class

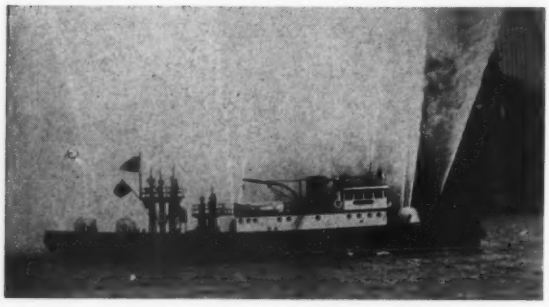


1925 The L. A. City No. 2, Los Angeles City F.D., 99 feet overall by 19-foot beam by 9½-foot draft; 10,200 gpm at 200 psi. It is gasoline-driven as are two smaller boats

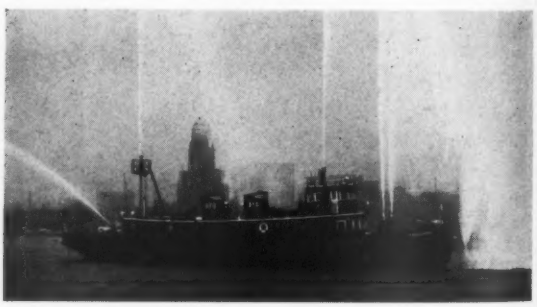
1926 The Port Houston, Houston F.D., is 118 feet overall by 27-foot beam by 8½-foot draft; discharges 8,000 gpm. It is the first fireboat built with diesel-electric drive



1927 The Alki, Engine 5, Seattle F.D., 123½ feet overall by 27-foot beam by 7½-foot draft; 12,000 gpm, was originally gasoline-driven but converted to diesel in 1949



1930 The John J. Harvey, Engine 85, NYFD, is 130 feet overall by 28-foot beam by 12-foot draft; discharge is 16,000 gpm. It is now being converted from gasoline to diesel electric



1953 The Firefighter, Buffalo F.D., formerly the W. S. Grattan built in 1904, was entirely rebuilt and converted to diesel. The ship is 118 feet overall, discharges 15,000 gpm

M. Flanders, the first specially built and municipally owned American fireboat.

Our account of the floating fire engines divides into three phases:

1. The period of steam boats with reciprocating piston pumps
2. The period of steam reciprocating propulsion engines and turbine-driven pumps
3. The period of propulsion and pumping by internal combustion engines, both direct-connected and through electric motor drive

Starting with the pioneering cities of New York and Boston, the list of American cities and ports operating fireboats includes Portland, Me.; Boston; New York; Newark, Philadelphia; Baltimore; Washington; Norfolk; Wilmington, N. C.; Jacksonville; Galveston; New Orleans; Houston; San Diego; Long Beach; Los Angeles; San Francisco; Portland, Ore.; Vancouver, B. C.; Milwaukee; Chicago; Detroit; Cleveland; Buffalo and Pittsburgh. The names of approximately 95 fireboats are registered as in service at some time during the period beginning in 1873.

The first municipal fireboat

The first municipally owned "floating engine"—the *William M. Flanders* of Boston—was built by the Atlantic Works, East Boston, at a cost of $19,894 and followed the general description of the steam tugs of the period. Her hull was iron, 75 feet in length, 15-foot beam and 7-foot draft. The vertical direct-acting engine turned a single propeller. The two Amoskeag fire pumps had a total capacity of 2,000 gpm and were of the vertical steam fire engine type.

The *Flanders* was in service as Engine

31 of the Boston Fire Department until 1889 when replaced with a new boat named *Number Thirty-One.*

The fireboats of New York

In 1874 New York City contracted with Wood, Dialogue & Co., of Philadelphia, for the construction of a wood hull fireboat 106 feet in length, with 22-foot beam and 10-foot draft. She was equipped with four Amoskeag vertical duplex pumps, having a total capacity of 6,000 gpm at 120 psi. Named the *William F. Havemeyer,* this boat went into service May 12, 1875, as Engine Co. 43, with a crew of two officers, pilot, two engineers and five firemen, who lived aboard. Like all of the early fireboats, Engine 43 had no house ashore and could be moved, as it frequently was, to different berths with no more preparation than providing ship-to-shore connections for telegraph instruments in pilot house.

During the 32 years following the commissioning of the *Havemeyer,* the cities of New York and Brooklyn built eight more fire fighting craft of the coal-burning, vertical duplex pump class for protection of New York Harbor. The two Brooklyn boats, the *Seth Low* (1886) and *David A. Boody* (1892) were of wood construction throughout, with combined capacity of 9,000 gpm at 200 psi. All of the New York City boats after the *Havemeyer* were the steel hull type. The *Zophar Mills* was put in service in 1882, to be followed by the *New Yorker* (1890), *William L. Strong* (1898), *Abram S. Hewitt* (1903), *George B. McClellan* (1903) and *Cornelius W. Lawrence* (1907).

The *Zophar Mills* was the last of the New York boats with living quarters aboard for the entire crew; with the designing of the *New Yorker* a new class was evolved. She was propelled by a triple-expansion engine swinging a single propeller. The four vertical duplex pumps were rated at 15,300 gpm at 150 psi and 11,500 gpm at 200, making her the most powerful fireboat ever built of the reciprocating pump class. Her dimensions were 126 feet in length, 26-foot beam and 11½-foot draft.

Incidentally, the architecturally distinctive shore station of the *New Yorker* at The Battery, close to the old Castle Garden, was a famous landmark for many years, being razed in 1941 when construction was started on the Manhattan-Brooklyn tunnel. Since then, Engine 57, the fireboat at The Battery, has been "temporarily" berthed at Pier 1.

The Chicago fire fleet

Chicago built its first fireboat, the *Chicago,* in 1888. She was of wood construction, 90 feet long, 18-foot beam and 8½-foot draft, with two vertical duplex pumps rated at 3,000 gpm at 150 psi. The *Chicago* was followed by the *Geyser* (later renamed *Denis J. Swenie*) in 1886, the *Yosemite* in 1889, and the *Fire Queen* in 1892. They were all wood-hull craft, the largest being the *Geyser,* 109 feet in length and 24-foot beam, with capacity of 4,500 gpm at 150 psi.

The *Fire Queen* was purchased by the World's Columbian Exposition Company for the protection of the 1893 World's Fair. Being designed for service on the lagoons of the fair grounds in Jackson Park, this craft was of shallow draft, 3½ feet. Her length was 90 feet and beam 16 feet. The pumps were rated at 3,000 gpm.

At the close of the Fair, the *Queen* was turned over to the Chicago Fire Department for "services rendered" and was removed from Jackson Park to a new berth in the North Branch of the Chicago River, where she went into service August 11, 1894, as Engine Co. 71.

The first steel hull fireboat, and the last one with reciprocating pumps built for Chicago, was the *Illinois,* commissioned January 14, 1899 and assigned to Engine Co. 37. The Chicago Fire Department then had five fireboats in service—Engine Companies 37, 41, 58, 71 and 92. Three of these companies are now land units.

Smaller boats advocated

A leading architect of fireboats during the early years of specially designed fire fighting craft was H. deB. Parsons. At a meeting of the Society of Naval Architects and Marine Engineers, held in New York in November of 1896, Mr. Parsons read a paper in which he referred several times to the size of the fireboats then being built and argued the case for smaller boats than those often demanded by fire departments. He said, "There is little or no benefit to be derived from boats exceeding a certain size. Large boats become unhandy and slow in maneuvering, both of which requisites are of the greatest importance in fighting a fire. For the same reasons, it further appears that speed exceeding 14 statute miles per hour is also a sacrifice in general efficiency. Exceptions may, however, be taken for boats in certain localities which have long distances to protect. In many such localities it would be better to have two smaller boats."

It seems that Mr. Parsons was ahead of his times in advocating smaller boats. Modern diesel craft, which can house equal capacity and power in half the hull displacement when compared with the coal-burning steam boats, have made it possible to reduce the size and increase the maneuverability of fireboats, and the advantages looked for by Mr. Parsons are found in the modern boats without sacrifice of capacity.

Centrifugal pumps adopted

Up to 1907 about 30 steam fireboats with vertical duplex piston pumps had been constructed. None of these had water tower masts and only the *George H. Williams* of Portland, Ore., had an elevating standpipe. Some of them, starting with the *New Yorker* (1890), had multiple monitor guns of large capacity and manifolds arranged for centralized control of a number of hose lines.

Edward F. Croker, who was chief of the New York Fire Department from 1899 to 1911, was a fireboat enthusiast who made a regular practice of inspecting the fireboat fleet on Sunday mornings. His inspections were not superficial and by close observation and study he developed many ideas which were eventually incorporated in his conception of the ideal fireboat type.

On a number of occasions while he was head of the uniformed force, Chief Croker directed fire fighting operations from the deck of a fireboat. A notable incident was the great Hoboken waterfront and ship disaster of June 30, 1900, which resulted in the burning and sinking of the liners *Bremen, Saale* and *Main,* and numerous smaller vessels, and heavy destruction of shore installations. Chief Croker ordered the New York fireboat fleet to the scene and directed operations from the *New Yorker,* which rescued 28 persons from the burning and drifting *Bremen* and participated in countless other rescues accomplished by the New York fleet. The death toll reached 148.

Another disaster in New York waters was the burning of the *General Slocum* on June 15, 1904, with a loss of 1,021 lives. The first company to respond was Engine 51, then the company number of the fireboat *Zophar Mills,* stationed at 97th Street and East River. On receiving the preliminary report at headquarters in East 67th Street Chief Croker ordered Engine 77, the fireboat *Hewitt,* to respond and to stop at the foot of East 67th Street to take him aboard; he remained on the scene of the sinking of the *Slocum* the balance of the day to direct search and rescue operations.

New York was the first city to organize its fireboats in a marine unit. Chief of Battalion John Kenlon, the only chief officer having master's and pilot's licenses, was assigned by Chief Croker to set up the Marine (19th) Battalion on June 16, 1905. In 1909 the battalion became the Marine Division and Chief Kenlon was promoted from the eligible list to be Deputy Chief of the Marine Division, the only chief officer ever promoted to this specific title.

When the construction of three additional fireboats was planned in 1907, Chief Croker embodied his ideas in definite recommendations: "The fireboat I would recommend should be 120 feet in length overall, with a 24-foot beam and 9-foot draft and should be built of steel.

"The decks should be flush fore and aft, and as clear as possible of all obstructions. The common practice of providing a large pilot house should be avoided.

"If the turbine could be reversed as quickly and certainly as the reciprocating engine, I would favor it, but in this regard many things still remain to be demonstrated with this otherwise excellent prime mover. For the present, at least, I recommend that the reciprocating engine be used as propelling agent for the boat, and the turbine to operate the fire pumps.

"Centrifugal pumps, when turbine-driven, will do the same work with half the steam required by reciprocating units. I therefore believe that centrifugal pumps having a capacity of at least 8,000 gpm should be installed and that they should be driven by turbine engines."

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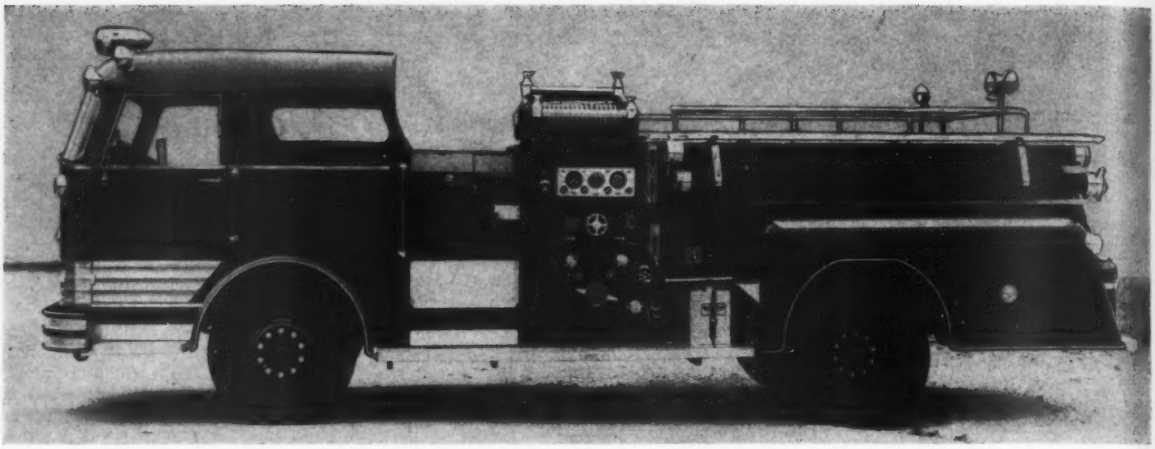


This pilot pumper model built for the New York Fire Department incorporates many of the desired features listed by fire chiefs who answered FIRE ENGINEERING's questionnaire survey. Only difference between this and the 40 units now on order will be addition of a portable monitor nozzle mounted on each cab roof—*New York Fire Department Photo*

What Fire Chiefs Prefer in Apparatus Design

There have been many revolutionary changes in fire fighting equipment and methods in the last 80 years—but none of them happened over night. Here's how representative fire chiefs forecast the future. . . .

A SPECIAL FIRE ENGINEERING STUDY

FIRE APPARATUS may be defined as "those vehicles used in the extinguishment of fires, for rescue and salvage work, and for other special activities performed by fire departments."

Next to having trained fire fighters, nothing is more essential to the fire department than modern, dependable apparatus. That word "dependable" is used advisedly. Dependability is listed as the principal requirement by the National Board of Fire Underwriters. Other essentials which have been determined by practical use through the years are: Speed and acceleration; ability to maneuver; visibility for driver and crew; protection and comfort of personnel; ease of repair and maintenance; adaptability; power (with reserve); stowage space. Of course, there are other related essentials such as cost, service obtainable, etc.

Most of the noteworthy improvements in fire apparatus design and construction have come within the past 80 years—the life span of FIRE ENGINEERING. Eighty years ago the great question of mechanical (steam) powered pumps versus the manual types was being settled in favor of steam. Progress accelerated considerably with the invention of the automobile and the application of the principle of self-propulsion to fire apparatus, followed by the general adoption of gasoline as a motive power both for fire apparatus and pumps. From the commencement of this revolution in propulsion dates probably the greatest single advance in fire apparatus improvement.

Other developments which were offshoots of this improvement included such present-day essentials as electric starting and lighting, the pneumatic tire, positive brakes (on first two, then four wheels) and even the simple windshield and its power wiper; all of these have come into being and been accepted matter-of-factly by the fire service.

One major advance worth recording was the adoption of enclosed and semi-enclosed apparatus bodies. Ironically, these and other improvements have materialized in the face of opposition—some of it vehement. But notwithstanding the skepticism, the general quality of our fire apparatus has consistently improved through the years, if without fanfare.

Most of the progressive improvements in our apparatus and equipment have been inspired by necessity. Increase in the number and type of fire hazards being encountered by the fire fighter; shifting of people and business as part of our stepped-up living imposing new demands for fire protection; the increasing volume of automotive traffic everywhere; the improved roads and highways—all these and other factors have registered their influence upon the fire service and its major facilities.

Mechanically, that is in the power plants, transmissions and pumping mechanism, no radical, revolutionary changes have occurred. Perhaps the introduction of the multi-stage pump permitting a far greater flexibility of pumping action than was known heretofore was the most outstanding development of the last decade. But this does not mean other changes, possibly some of them radical, are not in prospect.

Certainly there will be further developments, and to get a line on just what these may be, and their relative importance, FIRE ENGINEERING, as it has in previous years, has gone into the field to find out. This year over 1,500 representative fire chiefs in as many cities of different size and geographical location were polled to gain the answer to these questions about the future of fire apparatus.

The results of this poll as reported here with an interpretive study of the suggestions and comments from over 500 respondents provide the most comprehensive evidence upon which to forecast the future of fire apparatus.

First showing of the pilot model of a new type governor is demonstrated by its originator, Deputy Chief Louis E. Vogt, at the Rochester, N. Y., Fire Bureau shops to M. H. Gregg and F. J. Decker, consulting engineers—*Rochester Times Union Photo*

The study found a number of chiefs complaining about old, narrow streets with their attendant traffic problems. Most of these were of the opinion that fire apparatus had become too wide and they voted for narrower vehicles.

A substantial group of proponents of standardization was heard from. One chief considered the call for economy in the fire service could be met only in this manner. He suggested that manufacturers standardize on individual apparatus and leave it up to the municipality to equip it as they see fit.

Deputy Chief Eric A. Lotz, Los Angeles Fire Department Shops, suggests that apparatus manufacturers incorporate as many standard component parts as is possible. He believes the fire service will benefit from the improved engineering this will make possible, resulting in lower cost per unit, and better parts replacement practices.

Continued on next page

Over-all design changes

It was indicative that many fire chiefs paid the apparatus industry a fine compliment in their answers; 43 per cent stated that they felt the equipment was perfectly satisfactory at present and barring unusual conditions, they believed that no changes were necessary. The slim majority considered that improvements should be made in many details. None of these improvements, when analyzed, was very radical but when summed up, they do indicate that the fire service has been giving serious thought to the subject.

Closely tied in with the design changes recommended was the present problem of traffic congestion in most urban areas. It was for this reason that many chiefs call for apparatus with shorter wheel base, not only on pumpers but on aerial ladders as well. Incidentally, this question of shorter wheel base to increase vehicular maneuverability has recurred with each survey conducted by FIRE ENGINEERING. It apparently grows in importance as the traffic problem multiplies.

Another detail that received a strong vote is the cab-ahead type unit. The cab-forward design was advocated for wider use, not only because of its increased visibility but also because it tended toward the shorter wheel base.

A sizeable group also advocated that apparatus be built lower over all. One chief, commenting on this point based his belief on the advantage of having the rear step lower in order to facilitate access to the pumper by firemen. The same chief said he would prefer the steps to be wider in order to accommodate rolled hose as required.

In direct contrast were several chiefs who encounter problems of road clearance; their preference is for apparatus chassis with higher cross members. Several of these departments have to contend with high crown rural roads or trails where jutting rocks and stumps are a serious hazard. A number of chiefs in metropolitan areas where paved roads exist also expressed the preference for ample road clearance.

Summary

What important changes do you favor?

No changes	43%
Larger booster tanks	8%
Shorter wheel base	7%
More compartment space	6%
Cab forward design	5%
Built-in high pressure fog	4%
Preconnected 1½-inch hose	4%
Power steering	4%
Standardization	3%
Lower apparatus	3%
Narrower apparatus	2%
Miscellaneous	11%

Apparatus with closed cab:

On all apparatus	57%
All except aerials	4%

Improvements desired in engines:

Present engines satisfactory	15%
More horsepower	10%
Lower rpm's	8%
Six-cylinder engines	6%
Simplify engines	2%
Diesel engines	2%
Less weight	2%
Easier access	2%
Miscellaneous and no comment	53%

Use high octane or premium gasoline:

Favor	83%

Buy specification gasoline:

Favor	10%

Automatic transmission:

Favored	41%
Opposed	45%
Undecided	14%

Station wagons:

Considering	37%
Using	20%

Miscellaneous suggestions:

Air brakes	66%
Tubeless tires	14%
All weather treads	71%
Sanders	29%
Undercoating	40%
Direction signals (required by law in some states)	92%

Apparatus color:

Preferred red	83%
Preferred color other than red	5%
Preferred white	8%
Preferred yellow	2%
Preferred red and white	2%

Type of battery satisfactory:

Lead acid	98.4%
Other	1.6%

Alternators or high output generators:

Apparatus equipped	84%
Drop in battery charging noted with equipment	61%

Intend to purchase in next 12 months:

(numerical total of pieces projected for 1,500 departments)

Pumpers	975
High pressure fog pumpers	70
Aerials	300
Quads	20
Quints	5
Rescue and ambulance	95
Utility trucks	250
Chiefs cars	660
Station wagons	250

Continued from previous page

Chief Edward E. Wischer, Milwaukee Fire Department, offered these comments: "We believe that one of the prime reasons for the relatively high cost of fire apparatus is the lack of standardization, which mitigates against the line production of such equipment.

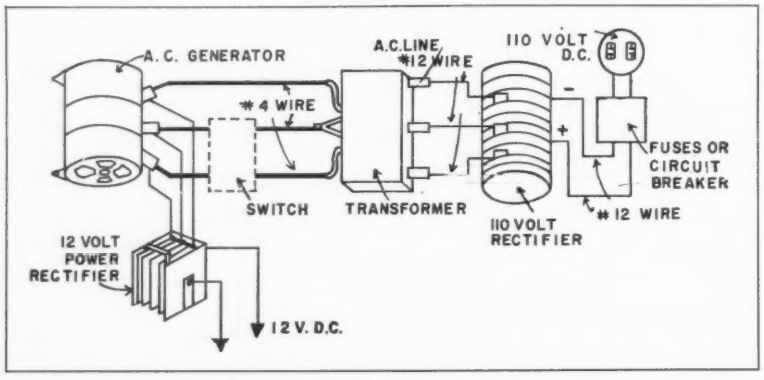
"We would advocate a committee be appointed to draw up a set of standard specifications embodying the specific requirements of all major departments, and probably another set to take care of the needs of the rural or smaller department. This would permit manufacturers to produce fire apparatus in the same fashion as other trucks, resulting in a much better price and faster delivery. In fact, it might be possible for manufacturers to stock apparatus, rather than custom-build them, necessitating a delivery date of at least a year or more. Minor variations could still be embodied if the basic design were flexible enough in certain respects."

Boosters and "preconnects"

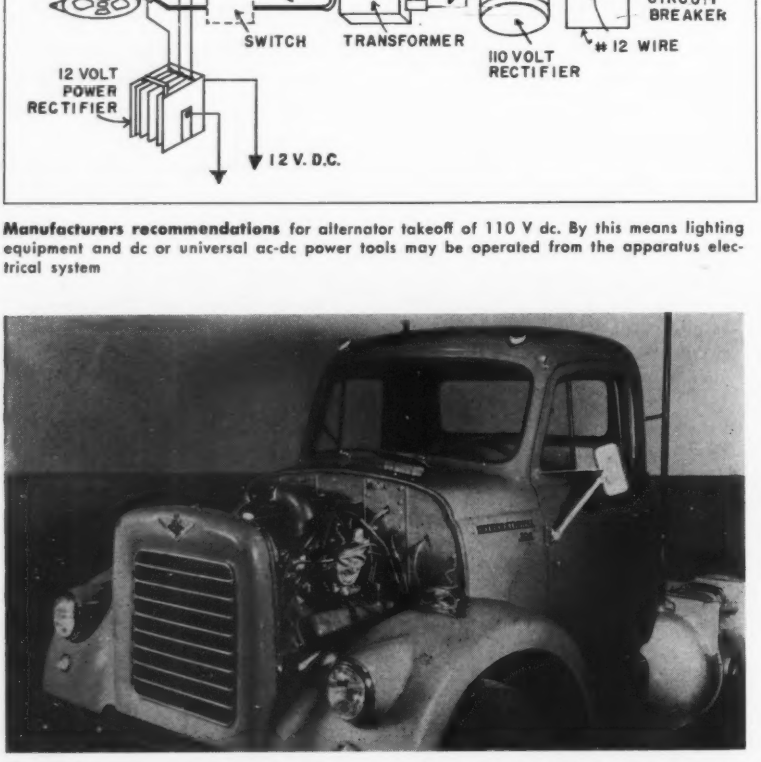
Larger booster tanks on pumpers are advocated by many chiefs. This reflects a trend toward preconnected hose lines and their advantages in providing fast attack at a fire. The increase in popularity of the "preconnects" is evidenced by a desire in some segments of the fire service to carry this method of attack even further and with it to enlarge the size of booster tanks. To increase the water-carrying capacity and at the same time decrease the size of the vehicle poses difficulties. However, Chief R. M. Hunt, Haddonfield, N. J., is of the opinion that more efficient use of the present space given over to the hose bed will solve the problem. He contends that the ever-increasing use of synthetic fibres in hose jackets will be reflected in smaller hose beds and the space thus gained can be used to advantage in decreasing the size of the apparatus, while at the same time satisfying the requirements of additional water capacity.

Coupled with the expressed preference for large tanks is the plea for more compartment space. Much of the apparatus delivered today contain compartments in every conceivable location in order that not an inch of space be wasted. Even the front fenders have been utilized for equipment storage. From this point of view, Chief Ernest Byrne, University City, Mo., contends that the enclosed cab on fire apparatus has been one of the great advances in recent years. He suggests that it be carried to a logical conclusion by enclosing the entire apparatus, thus protecting all personnel and equipment. At the same time the increase in compartment space possible in a design of this type might satisfy the need for more protected space. Several chiefs also added a footnote to the compartment problem. They suggested that access doors be made more weatherproof in order to keep equipment as dry as possible.

The enclosed cab itself is favored by 57 per cent of the chiefs; however, 4 per cent of the respondents qualified their remarks by limiting cabs to vehicles other than aerial ladders. Their main reason was that the all-around visibility necessary for working with ladders required open cab tops. The suggestion was made that perhaps this problem could be overcome by the use of plastic domes or glassed cab roofs somewhat like those used on helicopters, where all-around visibility is a requisite.



Manufacturers recommendations for alternator takeoff of 110 V dc. By this means lighting equipment and dc or universal ac-dc power tools may be operated from the apparatus electrical system



Liquefied petroleum gas fuel systems are now used in the trucking industry. They are available to the fire service as factory-installed, Underwriters-listed equipment. This illustration shows how one LPG-system looks installed on a V-type engine

Wider power applications

Some of the interesting highlights of the study were the opinions expressed on power as applied to apparatus accessories such as reels, etc.

A number of chiefs are of the opinion that a broader use of power might conceivably reduce the bulk of some apparatus.

Power steering is one of the accessories that has found favor with 4 per cent of the respondents. Chief C. H. Hebrard, Monterey, Calif., is one who states that the inclusion of this item on the apparatus in his department has reduced the accident rate. While most of the mishaps experienced previous to the installation of the power device were of a minor nature, they were caused by drivers being a fraction of a second late in handling the steering wheel.

Power brakes have been used by the fire service for many years. The increase in the size and weight of present-day apparatus has led many departments to the use of air brakes and 66 per cent of the chiefs reported they favored their use. Some qualified their statements by adding that their approval depended on a quick build-up of air pressure in order that they could be assured of adequate brakes at all times.

FIRE ENGINEERING queried members of the apparatus manufacturers' association regarding such equipment and was assured that the type supplied by several apparatus builders was designed in such a manner that the system will build up from zero to an operating pressure of 60 psi within 15 seconds. This is accomplished with an idling engine and would be quicker at a faster engine speed.

Automatic transmissions

The adaptation of torque converters and automatic transmissions to modern fire apparatus is a recent innovation

Continued on page 856

Firemen use electric power saw to release Atlanta, Ga., woman trapped following auto collision —*Photo–Milwaukee Electric Tool Corp.*

The Fire Service is paying more attention to power—

Making Mechanization Do It!

AS WE LOOK UPON the fire service in retrospect, and review its progress, we are impressed with the manner in which it has managed to keep abreast—if not ahead—of the fire and explosion hazards that have grown steadily more complex and costly of life and property, as concomitant of our way of living and working.

Within the life span of some of our veteran firemen we have emerged from the age of steam to that of electricity, then electronics, and now nuclear fission and related chemistry. Each transition has produced new and unbelievable hazards. Each has been a challenge to fire protection engineers and fire fighters to develop not only new fire control and extinguishing appliances, but new techniques and methods of using these new facilities—as well as the conventional fire fighting "tools" of yesteryear.

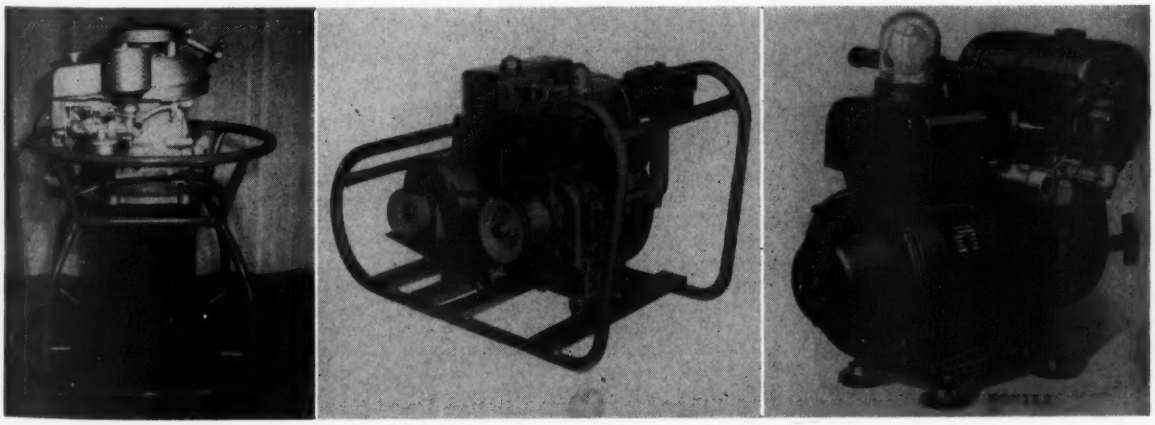
America has become the greatest nation in the world largely through our ability to multiply our skills and labor mechanically. Logistics they say, helped us win the two worst wars of history. And the same logistics has continued to put fire-killing power into the nation's fire service.

But although we have always had mechanical power since the day of the first steamer, complete mechanization of the fire service has been a plant of very slow growth. Such applications of power as we have seen and accepted, have come by easy stages, some of them without our being conscious of their importance. Certain of these shifts involving mechanical power, such as the advent of electric power starting, lighting and sounding sirens even the portable gasoline-driven units themselves—infiltrated rather than burst into the service. With the coming of hydraulic power, the fire service got another lift, literally as well as figuratively, as we shall see later on. And even before that, when we learned to compress air, and to develop gas pressures chemically (old timers will remember the carbonic acid gas and "chemical" applications to fire extinguishers and even to aerial ladders and water towers) we were able to adapt air power to numerous tasks formerly done by hand, the hard way.

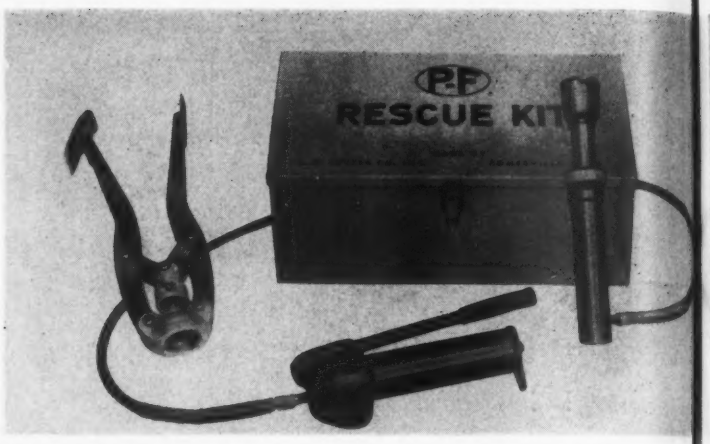
We are carrying mechanics even farther—through what is called "automation." Already ours is being referred to as a "push-button age" and here too, we find the fire service on the receiving end —with profit all around. Already automation is picking up fires as quickly as they start—shooting in the alarm, setting the apparatus wheels in motion, changing our traffic signals for us and, under certain conditions, completely extinguishing the fires.

Automation is another term for power applied automatically without manual direction.

When we come to consider the question of putting more power into fire suppression it is well to remember that there is already evidence at hand within the fire service of the potent power of mechanization. There is scarcely an operation



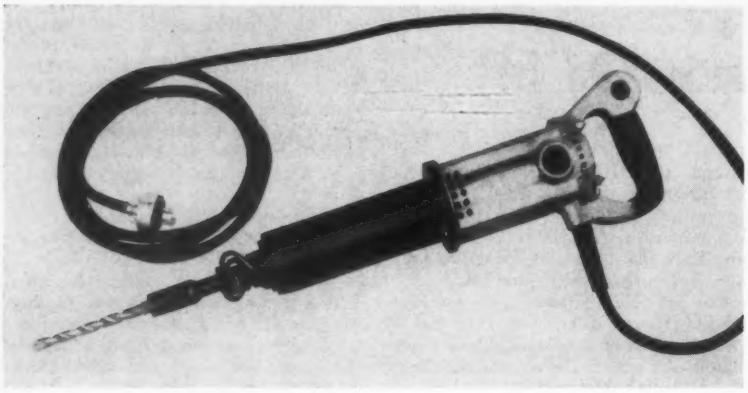
Three recent models of the many efficient generators available to the fire service. Left: Thor vertical shaft type rated at 1,500 watts; weight 95 pounds. Center: Pioneer Gen-E-Motor belt-driven or direct-coupled styles are rated from 750 to 3,000 watts. Right: Kohler Co. supplies wide range of sizes starting at 500 watts



▲ **Compact rescue kit** includes hydraulic jack which powers a ram and special attachments for pulling, pushing, clamping or spreading as desired for emergency
—Photo–H. K. Porter Co., Inc.

◀ **Auger for rescue** and rural and forest fire fighting. Powered by a small two-cycle air-cooled engine; operator has instant control
—Photo–Popular Mechanics

Electric utility hammer facilitates forcible entry and rescue involving masonry. It is also ▼ used for chiseling, gauging or drilling miscellaneous material *—Photo–Homelite*



▲ **Firemen use O'Brien** electric cutter which makes short work of opening up for fire fighting, ventilation, salvage and drainage
—N.Y.F.D. photo by Hellriegel and Heffernan

involving fire apparatus and fire fighting but what sees the application of mechanical power in one form or another, from elevating aerial ladders to operating fire pumps, valves, etc., and even in accessories such as steering and braking, winding hose reels, and drying hose.

Power sources—electrical

The value of any power-operated appliance or device used by fire fighters and rescue and salvagemen depends primarily upon the amount and kind of power that is available; the ease and speed with which it can be procured and applied; the dependability of the supply, the hazards involved, and its cost.

There are other factors, but these are the main yardsticks by which the power supply for any application such as we have described may be judged.

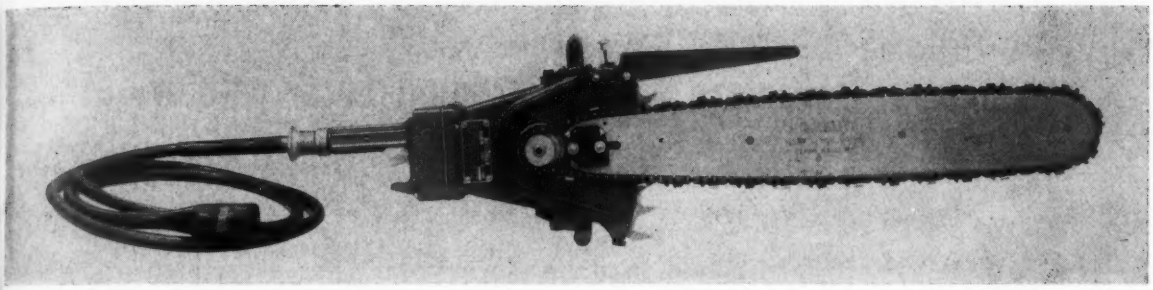
Gauged by these characteristics it is obvious that electricity is the most universal and efficient medium. It can be secured from three general sources: (a) Fire apparatus itself (as in the powering of radio) winding of hose reels, etc.; (b) from a municipal or private utility source (such as tapping utility light and power circuits); and (c) from a separate, self-contained power-generating system brought to the scene.

As related to fire apparatus, electric power found initial application albeit limited, in the field of lighting. With the advent of the electric motor-driven generator, which eventually ended the back-breaking cranking of the motor, the electric power plant of the fire apparatus took on added stature. And it is a credit to modern vehicular electrical systems—and those who manufacture them—that they have steadily been improved in dependability, capacity and output, as the demands for more electrical outlets and applications continued to multiply.

The ubiquitous alternator

Much of this improvement in power supply must be attributed to the popular electric alternator. It assumed real importance with the introduction of mobile radio in the fire service. With its advent on fire apparatus, the need for a greater, more reliable source of vehicular electric power than that supplied by the standard generator became pronounced. To fill this need, the alternator was advanced as a logical substitute.

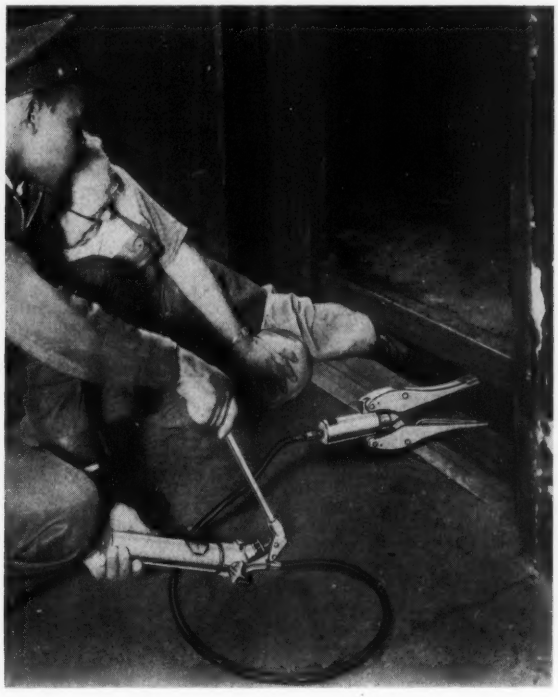
It wasn't long before it was realized that the alternator could be pressed into service as an auxiliary power source for not only nominal lighting equipment on the apparatus, but for limited "off-appa-



▲ **Electric chain saws,** such as this, powered by high voltage, high cycle generators, make quick, easy work of cutting timbers, trees, piling, etc. Other types are powered by gasoline engines or air —*Photo–Homelite*

Power on tap! Menasha, Wis., ladder carries portable generator, cable, lights, smoke ejector and heavy-duty stream appliance ready ▼ for instant use —*Photo–D. W. Onan and Sons, Inc.*

Elevator accidents call for powerful, fast-acting tools such as this hydraulic spreader, one of the essential devices in the latest type ▼ hydraulic rescue kit—*Photo–Blackhawk Mfg. Co.*



ratus" applications. It has since become standard equipment in most fire departments.

Taking cognizance of the increasing demand for the use of electricity in one way or another, the National Board of Fire Underwriters in its "Suggested Specifications for Motor Fire Apparatus" (Pamphlet No. 19), has this to say: "In view of the increasing demand for power on apparatus, the provision of an alternator of sufficient capacity is strongly recommended. When so specified, the purchaser shall indicate if an outlet is to be provided for electrically operated appliances."

The Board also recommends that dual batteries be supplied with suitable switching arrangements, so that either battery may be used for ignition and lights alone, or starting alone, or for starting, ignition and lights.

As an instance of the increasing use of electric power in fire department vehicles, besides the two spotlights, two headlights, two side or dash lights which "shall be provided," according to Pamphlet 19, there must be power for audible warning equipment, including "one electric horn and one electric siren." In addition, of course, the modern emergency vehicle carries some sort of flashing or warning light or lights, and the all-important radio. A majority, according to FIRE ENGINEERING's survey, also include a spotlight on a swivel.

Tapping the domestic supply

A source of power which is universally available, although under some varying handicaps, is the domestic light and power system of the community. Some cities have no hesitancy in tapping in on the street lighting system, for example, when an ample supply of requisite power is needed on the fireground. For the most part, this is done by emergency crews of the local public utility company, which normally respond to fire calls—at least to those of serious proportions—as well as to local disasters where mechanically driven equipment and lighting may be required on an extensive scale.

Power-operated equipment for venting buildings and dewatering may often be operated on the circuits within the building involved, provided, of course, that it is safe to permit those circuits to remain "alive." In some locations, a lead-in is run from a neighboring property to the affected area to facilitate use of power equipment. It should be remembered that such use of current may conceivably increase the consumption charges against

Continued on page 861

Baltimore Builds Training Facility to Meet Today's and Tomorrow's Scientific Needs

Half million dollar investment "has everything" to make for better firemen and firemanship

Fire fighters get the necessary practical training-by-doing. Entire area is blacktopped and floodlighted

IT IS OBVIOUS to anyone connected with the problems of fire protection and prevention that as the fire hazards identified with and a part of our present-day existence multiply in number and complexity, our methods and technique of coping with them must undergo continual revision and improvement.

Although we have made progress in many ways, such as setting up fire safety legislation and regulations; insisting upon improved fire detection, warning and control facilities; and in attempting to teach people the elements of fire safety, large segments of our municipal fire forces are still being trained in fire control customs and procedures that date back as far as World War I.

It is true that certain basic fundamentals in firemanship have changed little, and will continue to form the foundation for our firemanship training. These comprise the orthodox evolutions such as tying knots; handling simple tools and equipment and attendant operations which will always be found in the fire fighter's repertoire. But the methods of utilizing more specialized equipment to meet the new and unusual emergencies created by fires involving chemicals, gases, extraordinary thermal and even nuclear hazards, call for new and more scientific firemanship—new techniques of application. All of which have greater bearing upon the training of the fireman than ever before in history.

In days gone by, practically the only essential training element of the fire fighter was the drill tower. Some more progressive departments had lecture rooms, or even so-called fire colleges and a patch of drill yard. That was all that was necessary to provide this basic training. Every fire department drill manual started, and usually ended, with the 24 (more or less) "basic evolutions" for the fireman. The use of fire department equipment under actual fire ground conditions was learned to relative degree (depending upon the fireman's aptitude) by the time spent in firehouses when not at the drill tower, or lecture room.

If a fire department wanted to try out a new piece of fire fighting equipment, or develop new strategy in applying extinguishing agents, the best means for applying them was either a case of "dry running" or hunting up some source like a Navy School or industrial facility where adequate tests could be made. Even though many astute chiefs of yesterday wanted to try out techniques and equipment under actual extinguishing conditions, it was seldom possible.

Thus the creation of municipal fire schools which went further than the drill-tower-lecture-room category was necessarily slow. Actually, it would appear that fully equipped state fire schools and colleges developed more rapidly than did the local municipal institutions. After all, no city fire schools and colleges are financially endowed, nor can their costs be assumed by state government or apportioned among many political subdivisions, as in some county setups. In a day of tight fire department budgets it is something out of the ordinary to expect a city administration to create and maintain a king's size training academy, school, college, or whatever it may be termed.

Yet that is precisely what a few courageous cities have done, notably Rochester, New Haven, Los Angeles, and San Francisco. And now comes the City of Baltimore*.

Fruition of five years' effort

The Baltimore City Fire Department Fire School, as it is termed, was dedicated with fitting ceremonies April 27, 1957 (FIRE ENGINEERING, May, 1957).

It represents the culmination of many years of endeavor by fire and civic officials, and others, to bring to the department "under one roof" all the elements and essentials of adequate, efficient, firemanship training. It represents to the city an investment of well over half a million dollars and it is interesting to know that city and fire officials including Mayor Thomas d'Alesandro, Fire Chief Michael H. Lotz, the entire Board of Fire Commissioners and John T. O'Mailey, the board's executive secretary, stress the fact that this is an "investment" not an expense.

The school, and four-acre site, at 6720 Pulaski Highway, was approved by the City Planning Commission December 20, 1950. A Fire Facilities Loan was approved by the voters of the city on May 8, 1951. Ground was broken June 14,

* It should be said that a number of other cities have modern training schools under way or on the drawing board. Boston is preparing for a new plant; New York City has a $3 million project on paper, and training-by-doing is presently being carried out on Welfare Island under direction of Deputy Chief in Charge Otto H. Knochenhauer. Nor should we overlook the many excellent county and state facilities, most of which have been described in FIRE ENGINEERING and are listed monthly in the calendar of colleges.

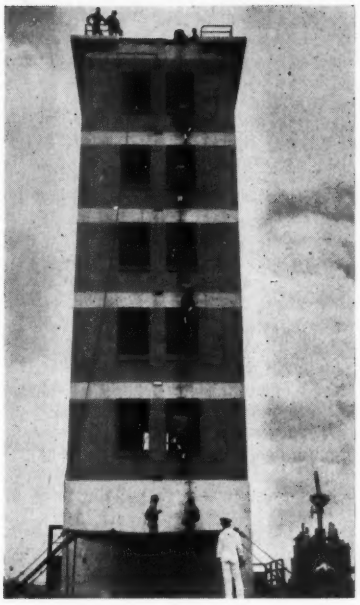
1955, the corner-stone laying held April 6, 1956 and the school officially accepted January 30, 1957. Thus it may be seen that institutions of this nature do not spring into full flower over night. It takes patient, persistent, and often discouraging effort to turn dreams into actualities, as one chief officer expressed it.

Certainly during the development period, there was ample time for consideration of all factors essential to the project.

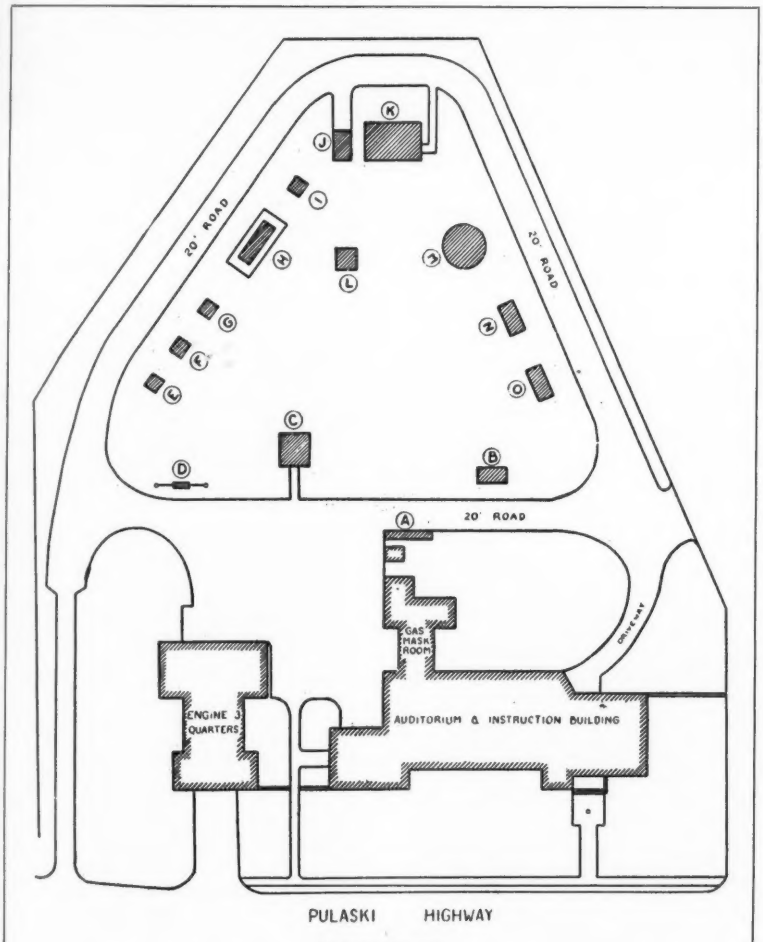
In passing, it should be said, the institution is so located with respect to the public and business places that training activities carried out at the school—such as extinguishing smoky fires—will create the least annoyance and complaint. Furthermore, the entire acreage and facilities are fenced in.

In addition, there is the added advantage of having a fire company (Engine 3) right on the grounds. Its station fits into the architectural pattern of the school.

What impressed FIRE ENGINEERING's observer on his tour of this school in company with Deputy Chief Frank J. Trenner, operating head of the training program, was the meticulous attention given to what some might term minor details but which nevertheless, in the aggregate, bear considerable weight. Thus, for example, the "working" part of the grounds, that is, all areas not covered by buildings, are paved with blacktop and/or concrete to provide greatest resistance against wear and tear due to fire and chemicals, yet insure good and easy footing; the entire installation is fenced in and floodlighted for 'round-the-clock operations if desired. Public address systems carry voice to all parts of the area. Much thought has been given to drainage, and the location of various "burning units" with regard to wind direction, exposures, and safety to both fire fighters and public.



High point of the Baltimore Training School is six-story brick-masonry drill tower, complete with fire escapes, interior stairways, standpipes, sprinklers, etc. Here, probies are being taught use of pompier ladders. Note mounted turret and fittings, lower right



Nomenclature

A—Hose Testing Table.
B—Pumper Test Drafting Pit.
C—Drill Tower.
D—High Tension Electric Grid.
E—Electric Motor.
F—Oil Burner.
G—Electrical Transformer.
H—Tank Car and Pit.
I—Christmas Tree.
J—One-story Garage.
K—Fire Training Building.
L—Thermocouple Dial House—Instruments for Measuring the Amount of Heat in Fire Training Building "K."
M—30-Foot Diameter Oil Pit.
N—20'x30' Rectangular Oil Pit.
O—Concrete Mat.

The various elements of the school are plotted in the accompanying diagram. The main structure is known as the auditorium and instruction building. The auditorium has a seating capacity of 900, a stage with all the necessary "props" and lighting, together with an approved projection room, ventilated from the outside. The folding chairs for this big room are stored on dollies under the stage when it is desired to use the auditorium floor for other purposes. The department's largest apparatus units can be driven into the big hall for use in classes during inclement weather.

Other facilities in the huge one story brick structure include a library, various locker and rest rooms, a completely equipped kitchen, and a gas mask instruction chamber for teaching trainees the use of respiratory protective equipment under actual smoke and gas conditions. In this instruction, men are required to don all types of masks, crawl through dark, constricted spaces under conditions simulating the worst which they might encounter in actual rescue or fire fighting. By means of heavy glass partitions they are under observation most of the time.

The drill tower

The next most prominent structure on the grounds is the drill tower. This is of brick and cinder block and concrete and rises six stories and basement. It is square in shape and contains standpipes, sprinkler system with exterior alarm and other features. The windows may be regulated for instruction in ventilation and the use of ropes and scaling ladders. A

standard fire escape on one side permits fire escape operations. A large ground net is located as a safety measure in connection with pompier ladder and rope evolutions.

The "fire building"

Next to attract the eye is the two-story fire training building and garage (K on the diagram). Here, firemen receive instruction under actual fire conditions. The building is constructed to withstand hot, smoky fires. The principal section is two stories in height, with full basement and attic; it is constructed of 12-inch brick walls, with reinforced concrete floors, attic and basement and it has a reinforced concrete foundation. The roof of the main section is ordinary joist and board construction, gable type, with metal fastened to the inside of the rafters, thus forming a ceiling which will follow the pitch of the roof.

A one-story addition to this building, of wood joist construction with transite board ceiling, is used as a garage.

Inasmuch as this training-by-doing building is the focal point of the school, a detailed description may be in order. The basement and two-story section contain three pits covered by steel grating and so arranged that flammable liquid fires may be kindled. The first floor is arranged to simulate an average dwelling and has built-in compartments approximately 3 feet square to resemble closets. This floor can be divided into four rooms by means of portable sheet metal partitions. There is a stairway from basement to attic and an outside steel fire escape from the second story to the ground. Interior doors and the door leading to the stairway are kalamein type. The windows in the first story are ordinary glass in steel sash, and those of the second story are glass in metal frames of various industrial types (to provide well rounded instructions in opening up). Ducts are included in the construction so that smoke and heat can be carried from one floor to another. These have removable steel plate covers. In addition, two openings approximately 14 by 14 inches are made in the concrete first floor where cellar pipes can be used.

The fire training building is equipped with thermocouples throughout for the purpose of taking temperatures in various parts of the rooms during the different fires, so as to demonstrate to trainees the phases of temperature rise and fall after water is applied. The building is also equipped with a sprinkler and ADT system as well as an outside annunciator to indicate fire location.

Located not far away from this training building is a smaller structure (L on the diagram) which houses the pyrometer used for measuring the heat in the fire building (K).

Considerable thought has been given to the type, size and location of the several pits used in extinguishment of Class B fires. Two of these pits (M and N in diagram) are provided. The larger is a 30-foot diameter circular receptacle built of concrete and divided by spacers into four sections. The steel spacers, or baffles are removable. Here oil fires are fought using various types of fuel and extinguishing agents.

Other flammable liquid fires are fought in a rectangular pit or tank measuring 20 by 30 feet having right angle corners, to demonstrate the difficulty of extinguishing certain types of fires in containers of this type.

A concrete slab is also provided (O on diagram) for simulating oil spill fires. The oil flowing freely across this concrete slab is ignited and trainees are exposed to the fire problems such as may be encountered by an overturned or ruptured tank truck wherein the oily contents are spilled on the highways.

This fire training building is designed and equipped to reproduce almost every kind of dwelling fire. Here masked fire fighters advance hose lines as crew ventilates attic

An actual railroad tank car (H on diagram) is mounted on reinforced concrete supports and located over a reinforced concrete pit, to provide experience in fighting tanker fires. This tank is filled with water and the fire is confined to the outside of the tank. A pipe which looks like a railing but actually is a supply line, runs around the top of the tank; this is so perforated that it sprays light oil or other solvent under pressure to intensify the fire involving both pit and tank.

Next, there is the "Christmas Tree," introduced by the Navy years ago, which has six horizontal pipes of various lengths extending in different directions and so arranged that a light oil or solvent can be pumped through each to add intensity to a fire. The whole is enclosed in a structure of ½-inch steel plate. Fuel is pumped to the "Christmas Tree" (as it is to all units where actual fires are fought), through an underground pipe.

Several other typical objects are provided to furnish practical fire control and extinguishing instruction. These include an electric motor (E on diagram) with shaft and gear mounted on reinforced concrete support contained within a concrete pit. A motor is equipped with perforated pipe through which oil under pressure is pumped for fires. Another unit is an oil burner (F on diagram) also located within a concrete pit. This has a fire pot and is so arranged that oil under pressure can be forced up through the center of the fire pot to simulate actual burning conditions.

Then there is a regulation transformer, mounted on a concrete base and within a reinforced concrete pit. A perforated pipe supplies this unit also with fuel to make a hot fire, simulating a transformer blaze.

Instruction in the electrical conductivity of fire streams is furnished by means of an electrical grid. This high voltage grid is made of steel suspended on a wire from two poles about 50 feet apart and equipped with transformers and a switchboard so arranged that voltage can be raised to 12,000 volts. When water is applied to the grid from nozzles of various types, the electrical feed-back can be measured on instruments provided to indicate how electricity follows a water stream.

Still another feature wherein trainees have opportunity to gather facts concerning fire hose, and its behavior under operation, and at the same time participate in actual fire hose tests, is found in the hose testing table (A on the diagram). To the best of our knowledge, this is the only such test installation of its type incuded in any municipal or other fire school or college. It was built under the direction of Fire Chief Michael Lotz; Battalion Chief John E. Thomas, in charge of training, and Thomas S. George, a consulting engineer.

Trainees in the department undergo a 35-day course at the new school. This includes driver training, gas mask training, first-aid instruction and a thorough grounding in the principles of fire fighting including the essential evolutions utilizing

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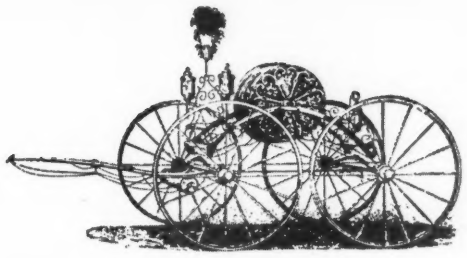


New Orleans Fire Department Rich in Tradition . . .

Visitors to the IAFC Annual Conference will find a fire force as interesting and distinctive as the fabulous city which it protects

WE ARE TOLD that the first provision to be made for companies of firemen in the City of New Orleans came in consequence of a devastating fire in the year 1788 in which some 800 to 900 houses, together with many public buildings including churches, the municipal building, military barracks, armory and public jail were burned with loss ultimately set at over $2 million.

This came at the time of the organization of the city government by Baron de Carondelet. One historian summed it thusly:

"The most useful teaching of this dreadful narrative lies in the illustration of the fact that unless forearmed with the implements especially designed to extinguish fires, no city has any hope of safety in the presence of fire."

The first official reference to organizing against fire appears in the ordinances of Carondelet in the year 1792, four years after the "great calamity."

The city was divided into four wards, each having an Alcade de Carrio, or commissary of police, to "take charge of fire engines and their implements, to assume command of all fires and to organize new companies as the occasion required."

That those in charge of fire protection had more to learn is evidenced by the fact that within two years another great calamity befell the rebuilt city. The area burned in 1788 was swept clean by a fire in 1794, in spite of all the efforts of the alcades and their firemen.

There follows a long interval during which there is no record of development of the fire fighting force, although it is certain some measures to improve fire protection were taken, and what passed for fire companies came into being.

We know that upon the reorganization of New Orleans as the chief city in the American territory in 1804, the city council passed ordinances "for the government of the fire companies."

Four engines in 1804

In April of that year, the council accepted the recommendations of a committee (presumably made up of those who were already "in the service of the fire engines") that for each of the four engines then in service in the four quarters of the city, there be a company of 15 men, commanded by a foreman.

Also that year, a committee was appointed—the first "fire committee of the city council"—to look after the details of the fire service and at that time, names were given to the early engines.

About then it was found necessary "to begin discipline," because the early companies were developing considerable independence of each other, the apparatus was being allowed to deteriorate, and so forth.

In 1806 enactments were adopted for the "careful policing of fires to prevent depredations," and the prohibition of shingle roofs (New Orleans was ahead of many cities at that time in this respect). We note that the jailer at City Hall "greased the engine and cared for the fire buckets kept there."

The "bucket ordinance"

On January 31, 1807, the council passed the "most important" ordinance of those early times, the famous "bucket ordinance" which summarized all existing regulations on the general subject, "including the precautions to be taken against fires, including use of combustible building material, digging of wells, etc."

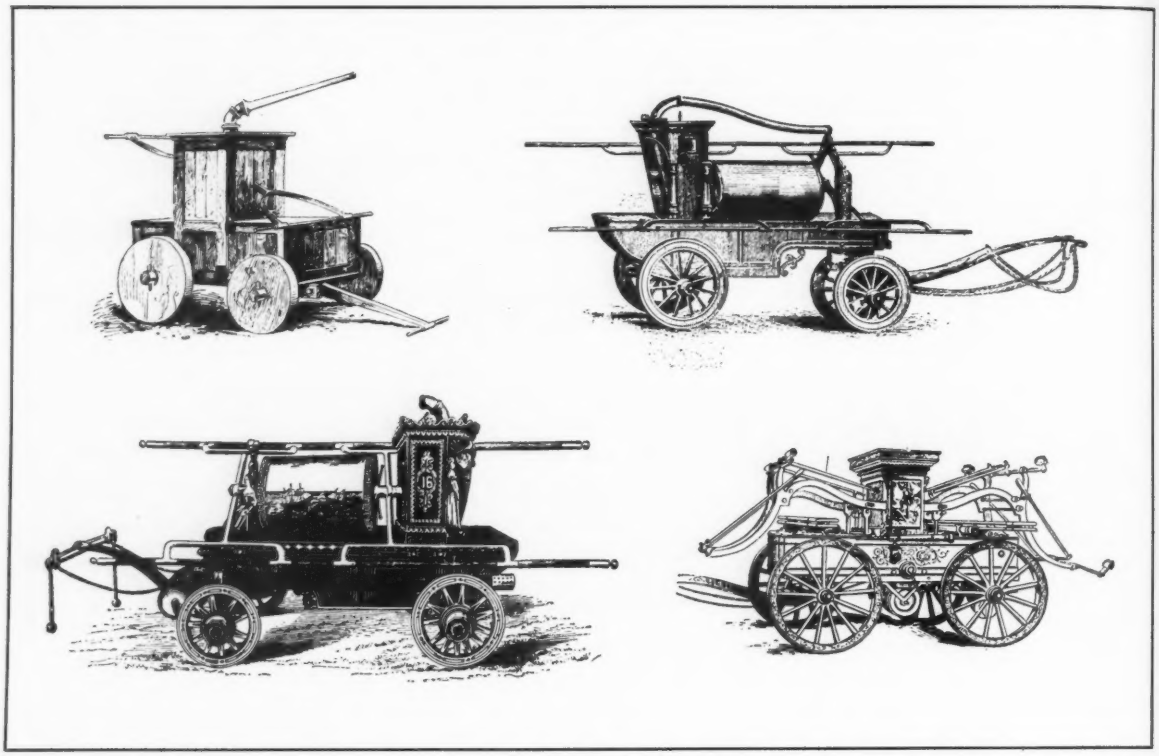
The first fire outfit to reach a scene was awarded $50.00. A watchman was required "day and night" to be on guard on the porch of the principal church—"to call the hours, and at the first light of a fire to ring the alarm on the bell." He also had to indicate to passing citizens the point toward which they should run to the fire by placing a flag if in daytime, a torch if at night, in the direction of the place where the fire appeared.

The problem of arson also raised its ugly head about then, when the council found it necessary to pass a resolution offering $500 to every person who shall "denounce and secure the conviction" of those persons who set fire to the house of Sieur Ardax.

In July, 1817, there were created under the name of fire commissions what were known elsewhere as "fire wardens." Bearing white bands as a badge of office, it was their duty to "repair to the place of fire in order to employ and direct all persons, whether free or slaves, who shall have come to the fire, by forming them into ranks for the purpose of handing buckets to supply the fire engines with water; to keep as far as possible from the fire all idle persons and other duties."

Chroniclers say this whole system was wrong (at the time); instead of forming a city fire department out of a strong volunteer organization as had been done successfully elsewhere, "it attempted to graft a volunteer following onto a municipal department made to order, and . . . without suitable materials."

In 1824, the then Mayor Ruffignac called a meeting at his office of engine and hose companies to try to improve the fire protection setup. An additional fire company recruited from among the



Top left: Hand engine of Mechanics No. 6—from Leeds' Foundry. **Top right:** Hand engine of Columbia, No. 5. **Bottom left:** Hand engine of Red Rover, No. 16. **Bottom right:** Double decker hand engine—type used by Companies Nos. 13, 14 and 22

lamplighters was urged. Their salary was to be $3 per month.

Economy then, as years later, dogged the firemen, "keeping out of the fire service the class of men most needed."

Although all the steps taken to reform the fire department, per se, are not known, it is recorded that early in the year 1829, the move was taken which launched the volunteer fire department of New Orleans "on its noble career." This was the organization of Volunteer Company No. 1. That year, another company was organized, first called Louisiana, and later, Mississippi No. 2. The year 1834 saw great activity in the organization of new companies, six new units coming into existence. They all marched in the great General Lafayette memorial parade.

The new companies were, in addition to those named, Lafayette No. 3 (later called Vigilant); Washington No. 4 (after called Neptune); Columbia No. 5 (offshoot of Volunteer No. 1) and Mechanics No. 6.

In 1855 there were as many as 24 engine, four hook-and-ladder and several hose companies, although that year also saw disbandment of several units. A force of 19 engines, one steam engine, four hook-and-ladder companies was maintained throughout the remaining period of the volunteer department.

Firemen's Charitable Association

It was in 1834 that the Firemen's Charitable Association, as it was popularly known, was organized. Originally intended to provide relief for the needy members of the department, it ultimately became the fire department itself for over a third of a century, administering fire service to the city as an independent body.

The story of the F. C. A. is in itself the story of the volunteer fire department. Although for the first 21 years it managed only its own internal affairs, nevertheless it exercised a controlling influence over the doings of the city's firemen and fire companies. Subsequently, it administered the fire department under successive contracts with the city.

Fire alarm system born

As the city grew, the question of fire alarm became increasingly important. By 1840 it became necessary to adopt some more effective way of sounding alarms and at the same time, fire districts were set up and the alarm bells tolled numbers to identify the municipal districts in which the fire was located.

An interesting item in the records of the period told about a machinist, A. C. Jones, who upon orders from Phoenix No. 8 undertook to build a hand engine. It was the first ever built in the city—and some say the last—but it had features which attracted wide attention.

This was in 1849 about which time trouble between the volunteers reached fever heat, engendering an antagonism which ultimately led to their abolishment.

The differences between the fire service and the city council continued to multiply. The latter's attempt to "force" a steam fire engine and a chief engineer upon the department, and failure to support the volunteers financially, contributed to the ill feeling. The choice of a chief engineer in direct opposition to the wishes of the firemen, did little to promote harmony.

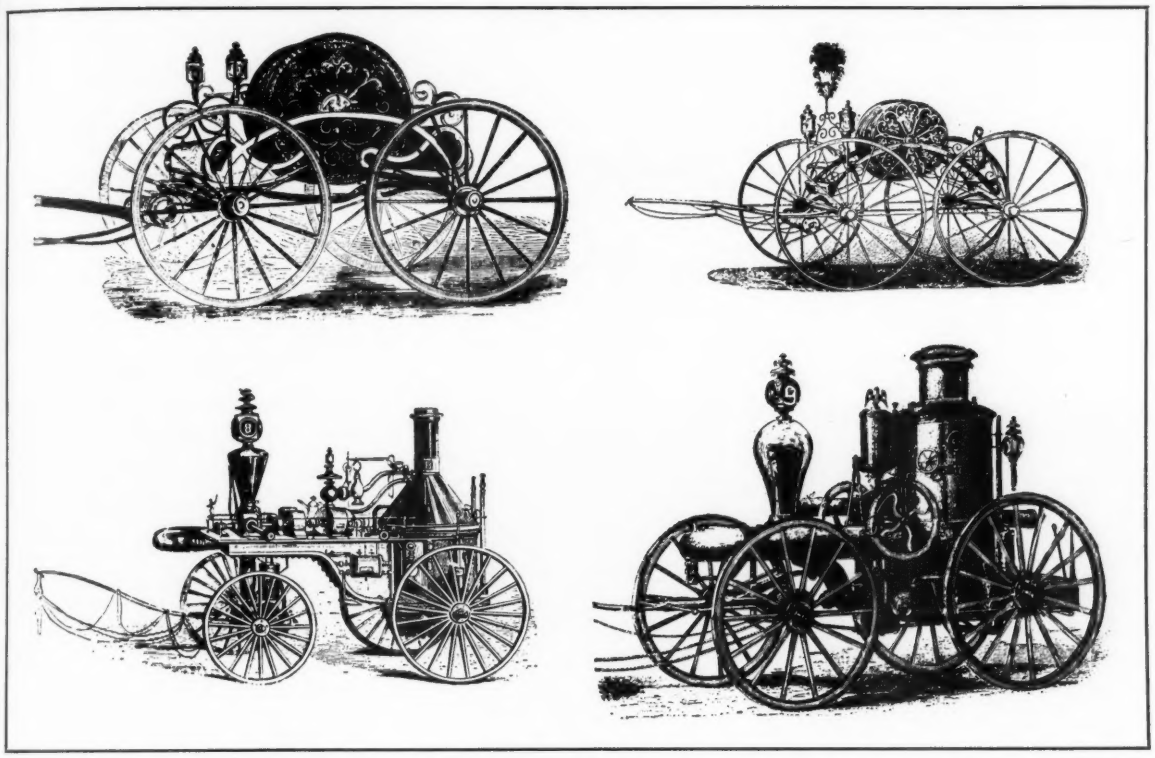
An ordinance adopted that year also created disfavor; ironically it called for payment to firemen for services. The volunteers termed it "degrading a lofty calling." And so out of the tumult and the shouting entered the question of the paid fire fighter.

Then the city council in a burst of misplaced zeal (according to some) abolished a number of companies (Nos. 4, 11, 15, 16, 17, 19 and Louisiana Hose).

In October the volunteers formally protested to the council about these and numerous other objections, including lack of hose and equipment and failure to maintain firehouses.

The city council, supported by insurance underwriters, favored a paid department and historians say "although they (the council) went through the motions of offering certain concessions to the firemen, these were scornfully rejected and the members prepared to carry into execution their threats of disbandment."

On November 20 of the same year, a special meeting of delegates was held and "in pursuance of the action taken," the several fire companies met in full uniform at 11:00 o'clock on Saturday morning, December 1, at Sataritte Square



Top left: Protection hose carriage; **Top right:** Louisiana hose carriage; **Bottom left:** Engine of Phoenix, No. 8. **Bottom right:** Steam engine used by Creole No. 9

and surrendered to the mayor the apparatus in their possession belonging to the city.

It is recorded that 24 engines and four hook-and-ladder companies filed slowly up Camp Street, to the solemn tolling of Louisiana Hose Company's bell, without banners, every man with his hat reversed and belt inverted, and a bit of crepe fluttering here and there from an engine and hose carriage.

At the square the firemen bid farewell to their machines which were turned over to Chief Wingfield. For the first time in its existence as a metropolis, the press said, "New Orleans stood without an organized fire department."

In the afternoon, the machines were hauled away to places designated by the mayor who issued a proclamation later calling upon all good citizens to rally to the rescue in the event of a calamity by fire—and advertising the locations of the different engines.

Under the pay system, so-called firemen were enrolled, but it was some time before any semblance of efficiency was developed in the department. Meantime the volunteers continued their fight and, to block a contract arrangement between the city and "certain special parties," they offered to furnish a force of 1,500 men and 23 companies for "an annual appropriation of $50,000" whereas the council wanted to organize a department of "350 men with 17 companies for about $85,000."

The Firemen's Charitable Association quietly bid in on the contract against competitors and secured it for $70,000 per annum, offering a further $70,000 for apparatus owned by the city.

Thus it happened that the control of the fire department passed into the hands of the Firemen's Charitable Association, where it was to remain "for 36 long years." The association promptly established a board of commissioners and elected a chief engineer in the person of Alfred Belanger.

An unusual situation

Thus we see a situation unique in the annals of the nation's fire service, a mutual benevolent association assuming administration of a big city fire department.

The department, although operating on a contract basis, was still to all intents a volunteer organization. Only the chief engineer, Belanger; two assistants, the treasurer, secretary and "employees of the steam engine" were salaried. In 1858 the force numbered 1,263 men, who manned 24 engine companies and the steam engine.*

At this time there were only 16 hydrants usable for fire fighting; the unpaved streets saw fire apparatus bogged down and relaying between engines was frequently necessary.

As time went on the controversy over the relative merits of steam vs. manual pumps grew. The more progressive volunteer firemen realized that it was useless to compare manual labor with that of steam. The ultimate result was the introduction of steam engines into six more companies, followed by still others until the entire department was so equipped. Louisiana Hose took a new machine in 1855; Volunteer No. 1 followed in 1860 when it acquired a Philadelphia steamer, and Nos. 2, 7, 8 and 22 were converted the year after. In January of 1873, the last four companies "concluded to drop their folly" and accepted the inevitable. They were Nos. 5, 6, 10 and 21. Milnebury No. 1 on Lake Ponchartrain continued with the only hand engine until 1889 when it asked for a steamer.

An improvement in 1858 was the equipping of the department with "Grenoble hose."

Comes the electric fire alarm

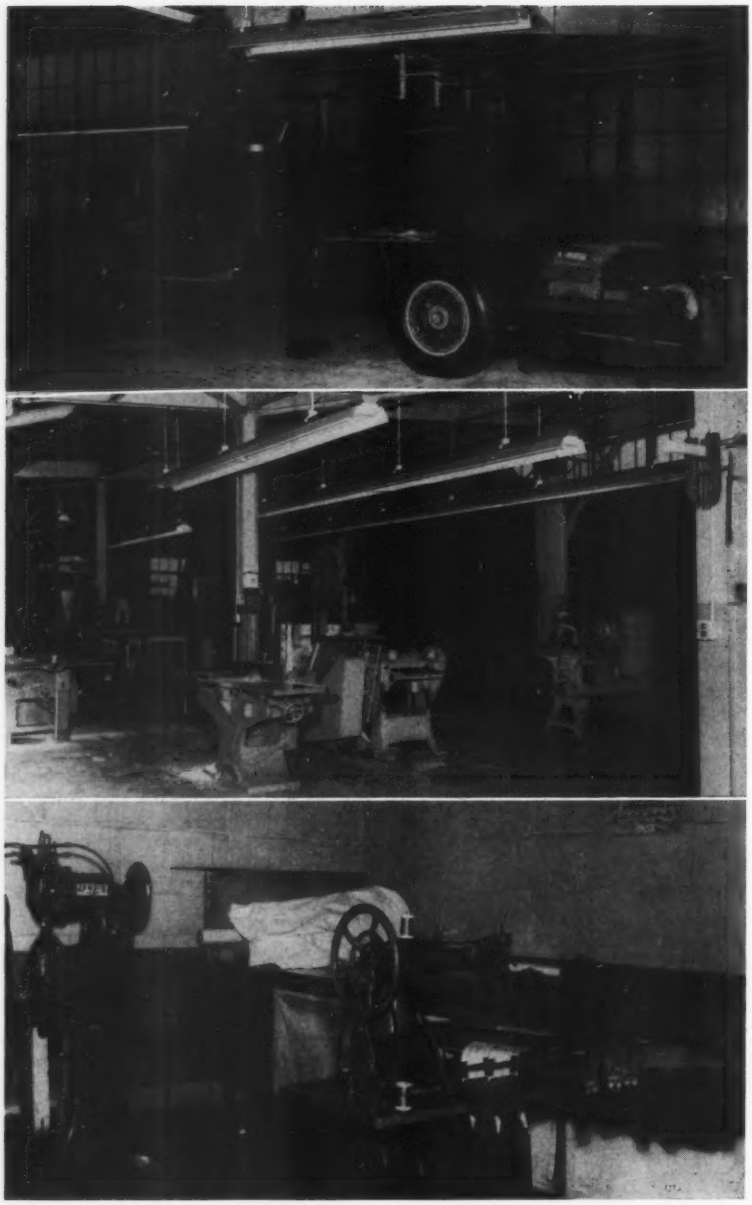
In 1859, the new Gamewell "electric" fire alarm system was put under construction and firemen heard their plea for repair of firehouses answered. Much excitement attending the sounding of the first telegraph alarm which it was hoped would occur on June 14th, but actually did not take place until 2:29 p.m., Friday, the 15th. That alarm reached the

Continued on page 870

* The steam engine to which frequent mention is made was secured in 1855 and called "Young America." It was built by Latta of Cincinnati costing ultimately $2,186.00, and its introduction was fought by the volunteers who preferred the manually operated types. The "cumbersome fire annihilator" was taken out of service in 1859 and a new steamer, the "John Adams" was brought in.

A Fire Chief Looks at

Preventive Maintenance—from the Administrative Viewpoint



General interior views of the Milwaukee Fire Department shops: Top: The modern shop is equipped to rebuild, remodel and even construct apparatus. **Center:** The woodworking section is geared for repair and rebuilding of wood products of all kinds. **Bottom:** Repair of firemen's fabric and leather goods is also an essential detail of shop work

—Milwaukee F.D. Photos by Captain Fred C. Barth

THE FIRE SERVICE is always predicated on strictly emergency operations, and in view of the very nature of the service, involving as it does the safety and well-being of human lives, as well as the safety of buildings, contents, automobiles, and everything else which can be attacked by fire, considerations of economy are secondary to the necessity for prompt and adequate response. By adequate response is meant pumpers and ladder trucks which are adequate in size and capacity, and adequate in the various safeguards which will insure their availability for full service at all times and under all conditions. That is why the fire service is unique among civilian activities, rivalled perhaps only by the military in its specifications.

Because of the demands placed on equipment by the fire service, considerations of maintenance and upkeep are important, equally so the initial specifications under which such equipment is purchased. In other words, from the standpoint of equipment, we cannot divorce adequate specifications and adequate maintenance, because no matter how well designed a pumper might be, if it is not properly maintained it will fail either to respond or to deliver the volume and pressure of water demanded. There is no substitute for constant vigilance and enlightened inspections.

Maintenance and upkeep

The need and importance of good maintenance and upkeep are so obvious as to practically eliminate discussion. It is just good business and common sense to properly care for any piece of equipment, aside from the necessity of preventing failure when it is called upon for operation. It is agreed that fire equipment will always be more costly than its equivalent in other types of motor vehicles, although some standardization might lend fire equipment manufacture to a modified line-type production, with consequent more favorable price factor.

Accordingly, having paid a premium price for this equipment, it stands to reason we should utilize all reasonable precautions and practices to guarantee its prime condition, not only because of service demands, but also in the interest of minimum expenditures for new equipment and major repairs. The old axiom, "A stitch in time saves nine," was never

By **EDWARD E. WISCHER**

Chief Engineer
Milwaukee Fire Department
in collaboration with

HERMAN SCHWENGEL

Master Mechanic

more true than in proper care and maintenance of fire equipment.

The very nature of the fire service is such that delays, malfunction, or any decrease in operating efficiency cannot be tolerated or excused. Waiting for repairs, adjustments, or replacements of apparatus, cannot even be considered in the scheme of operation. Response must be instantaneous, and the only insurance we can exercise to that end is to set up a comprehensive program of maintenance, and follow it religiously.

In contrast to most business operations in which the end result is dollar profit, the fire service must sacrifice economy in the interest of efficiency of operations. Yet, under a governmental type administration, wherein funds are limited by budget appropriations, too often we are hindered in what we would like to do because of financial limitations. Therefore, maintenance and repair programs must be a blend of the ultimate in scope, tempered by the maximum service permissible under existing limitations of facilities and personnel. In this connection, it is the feeling of the author that the fundamental dependence for good maintenance must be placed on the driver of the apparatus before any inspection program can be made workable.

Inspection program

The Milwaukee Fire Department has a comprehensive regular inspection program, which is the direct responsibility of the driver of the apparatus. His findings are forwarded to the Bureau of Machinery and Apparatus for review, and the items requiring service are taken care of through that bureau.

Drivers are not permitted to perform any actual maintenance service, other than changing oil and certain minor greasing, as well as keeping the motor and other parts clean. Even minor adjustments must be done by the shop mechanics, who perform much of this work in the fire stations. It has been our experience that to permit repair work and certain adjustments by the drivers, who have some knowledge of mechanics but not necessarily sufficient to know everything about the functioning of the apparatus, invites trouble. Some men are prone to tighten every bolt and nut in sight, others are continually adjusting the carburetor, etc., and still others would fail to do anything at all as long as the apparatus starts. These evils are best overcome by making the drivers responsible for the over-all inspection of the apparatus, utilizing a comprehensive inspection outline. A sample of our Vehicle Inspection Report is shown above.

Form F-65

VEHICLE INSPECTION REPORT
MILWAUKEE FIRE DEPARTMENT

Quarters of _____ Co. No. _____ Month of _____ 19____ Make _____

Apparatus No. _____ Code _____ Used as _____

OPERATION		NEED ATTENTION	O.K.
ENGINE			
ENGINE	(Clean)		
ENGINE OIL	(Observe level & Condition) - Date Last Change		
FILTER CARTRIDGE - Mileage at Last Change			
IDLING SPEED			
OIL PRESSURE	(Check at Idling and Maximum with Engine Hot)		
OIL LEAKS ON ENGINE			
MANIFOLDS AND EXHAUST SYSTEM			
FUEL SYSTEM			
AIR CLEANER	(Clean every 1,000 Miles)		
CHOKE ASSEMBLY	(Check for Operation)		
FUEL LINES AND BOWL	(Check for Sediment and Leaks)		
GAS TANK AND VENT	(Check for Leaks)		
COOLING SYSTEM			
COOLING SYSTEM	(Check)		
DRAIN COCKS			
FAN BELT			
RADIATOR, WATER PUMP AND LINES	(Check for Leaks)		
ELECTRICAL SYSTEM and ACCESSORIES			
BATTERY	(Check - Refill with Water - Recharge at 1.200 Gravity)		
BATTERY CABLES	(Check, Clean and Tighten)		
FUSES	(Inspect)		
GENERATOR	(Check)		
HIGH TENSION WIRING			
IGNITION PRIMARY TERMINALS			
INSTRUMENTS, ALL			
LIGHTS, SIGNALING DEVICES, AND SWITCHES			
REGULATOR, RELAYS, AND CONNECTIONS			
STARTER			
WINDSHIELD WIPERS - ELECTRICAL AND VACUUM TYPE			
OTHER ACCESSORIES			
SPEEDOMETER			
TACHOMETER			
BODY			
BODY BOLTS AND BUMPERS			
CAB MOUNTING BOLTS, OR FIFTH WHEEL MOUNTING			
DOOR GLASSES AND MIRRORS			
HOOD, FENDERS, RUNNING BOARDS, ETC.			
DRIVE TRAIN			
CLUTCH	(Check Pedal Free Play - 1" to 1-1/4")		
GEAR SHIFT MECHANISM			
LINKAGE	(Lubricate All Linkage)		
PROPELLER SHAFT UNIVERSAL JOINTS	(Check) Mileage Last Lubrication		
TRANSMISSION OIL LEVEL	(Check)		
DIFFERENTIAL OIL LEVEL	(Check)		
RUNNING GEAR			
CHASSIS	(Lubricate Completely) Mileage Last Lubrication		
LINKAGE	(Lubricate All Linkage)		
BRAKE, HAND	(Check for Effectiveness)		
" , SERVICE	(Check Fluid Level - Check for Effectiveness)		
BRAKE SYSTEM	(Check for Leaks)		
FLEXIBLE HOSES	(Check Condition)		
KINGPINS AND BUSHINGS			
STEERING MECHANISM	(Check)		
SHOCK ABSORBERS	(Check for Fluid)		
SPRINGS, FRONT	(Check Clips and U-Bolts - Tighten if Necessary)		
" " - SHACKLES, BUSHINGS, PINS AND BRACKETS			
" REAR	(Check Clips and U-Bolts - Tighten if Necessary)		
" " - SHACKLES, BUSHINGS, PINS AND BRACKETS			
REAR RIM OR WHEEL STUD NUTS	(Check)		
TIRES	(Show Dates Checked)		
"	(Inflate to Proper Pressure)		
"	(Inspect for Cuts, Bruises and Other Irregularities)		

(PUMP MECHANISM and AERIAL TRUCK INSPECTION LIST ON REVERSE SIDE)

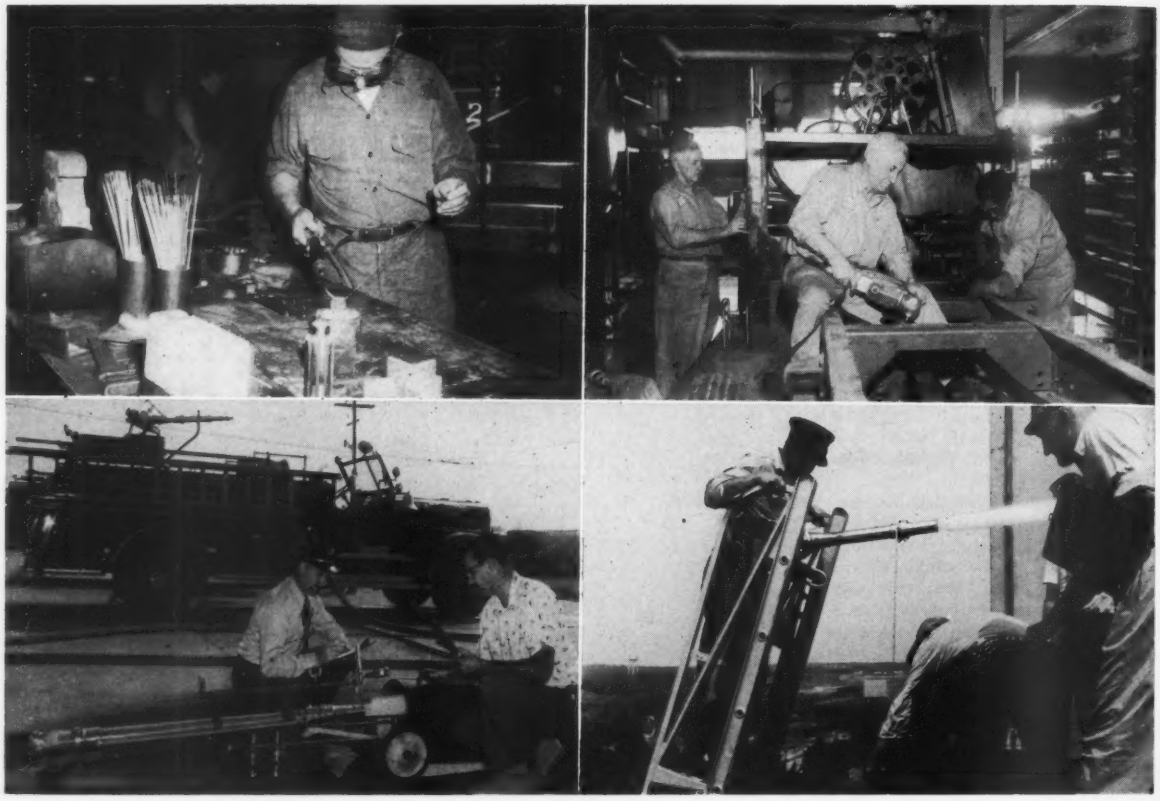
It will be noted that this form is as detailed as it is possible to make it, and each item must be checked and the findings listed.

Of course, this required periodic inspection does not not preclude the driver of the apparatus from reporting other deficiencies in operation, or repairs and adjustments necessary during the interim period between inspections. Such work is requisitioned on a regular form for this purpose.

Repair shop

The second phase of an adequate maintenance and upkeep program is a repair shop, staffed by competent mechanics, supervised by an officer who understands the demands of the fire service, with proper facilities in tools, equipment, supplies and repair parts. In addition, provision must be made for emergency pickup of parts and supplies, and for emergency repair work which cannot be done in the fire department shop.

Naturally, proficiency in the field of



Top left: Shopmen must possess a variety of skills for efficient fire apparatus maintenance. In the Cincinnati shop a welder repairs a part for an aerial ladder tractor—*Cincinnati F. D. photo.* **Top right:** Another outstanding shop is that of the Rochester, N. Y., Fire Bureau which is capable of coping with any maintenance job even to rebuilding apparatus—*Rochester Division of Public Information.* **Bottom left:** An essential of the master mechanic's duties is conducting acceptance tests as in this San Diego scene where a rating engineer and master mechanic record findings—*San Diego F. D. photo by Captain Leary.* **Bottom right:** Top officers of the West Milwaukee Fire Department testing aerial ladder prior to acceptance. Note fire axe held by brackets at the tip of fly—*West Milwaukee F. D. photo*

auto mechanics is paramount in the selection of personnel to man the repair shop. If such personnel is available from within the fire fighting division of the department, it is an additional benefit. Men who have had fire fighting experience will more fully understand the demands of the service.

Our policy has been to recruit first among department personnel to fill vacancies in the repair shop. Eligibility is determined by a requirement of several years experience as an auto mechanic or the completion of a vocational school course in this field. The examination is administered by an expert in auto mechanics, and thus far, Milwaukee has been able to find qualified men in the department to fill all vacancies. Prior to the examination, a trial period in the shop is offered to better study the man's background, and his performance during this trial period is used to arrive at the final competitive examination rating.

Good working conditions and particularly, adequate pay, contribute to the efficiency and production of the mechanics. Because of the specialized nature of fire apparatus and equipment, and the grave responsibility attendant upon the services of this equipment, we must be more critical of the fire mechanic's performance. In addition, there are many instances of emergency over-time or off-time work which are demanded. Accordingly, it is obvious that these men must be compensated at a higher rate than the regular auto mechanics, and this is the practice, at least here in Milwaukee.

The axiom that "good tools make the workman" is as true in the field of fire equipment maintenance and repair as it is in any other field, and probably more pronounced because as we have said, the fire service cannot afford delays. Fire fighters have limited time for testing before putting a vehicle back into service, and they must therefore, be certain in other ways that the machinery will function properly.

The physical maintenance and repair plant is important only insofar as it will permit or not permit the handling of the apparatus and its various components. A good supply of repair parts will shorten the out-of-service time. Very often certain parts are not available, necessitating the machining of such parts. At this point, it is worthwhile to comment on the value of an emergency repair truck, carrying a small supply of parts, going out into the field to make repairs and adjustments in the stations. This further tends to shorten the out-of-service time.

In certain circumstances, the shop can undertake remodeling, rebuilding and even construction of special apparatus and equipment. This has been done in Milwaukee with a considerable degree of success, both from an economic standpoint and from the view of acquisition of a good piece of equipment.

Contract service

"Farming out" repair work, and even regular maintenance work, is coming more and more into vogue. There is a certain value in adopting this practice where features of cost, better workmanship, and speed of completion, can be had to advantage. However, unless the advantage outweighs the benefit of having it done in the department repair shop, it should remain the local responsibility because it may tend to lower the standard of work performed. There is no substitute for experience, and by operating on our apparatus and equipment the shop personnel become acquainted with our facilities.

It is difficult, if not impossible, to detail which jobs should be "farmed out," because local conditions vary. The criterion very often might be that where the maintenance tools or repair equipment are so expensive, with very limited use, it is more expeditious to use outside services.

It should be kept in mind that commercial repair shops are in business to

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Simultaneous Fires Complicate Harlem Holocaust

DURING THE NOON HOUR of March 14, 1957, an employee of a wrecking company was using a cutting torch on the piping of a standpipe system in the cellar of 507-25 West 132nd Street, Manhattan, when sparks ignited combustible material to set off what Deputy Chief Harry G. Kihlgren, Fifth Division, described as the most rapidly spreading fire he has seen.

The building where the fire originated was of six stories, heavy mill construction, located on the north side of West 132nd Street between Amsterdam Avenue and Old Broadway. Originally it was a textile mill. At the time of the fire it was being demolished for a housing project.

The old factory was built in two sections, each about 100 by 150 feet, separated by a fire wall and the wall openings protected by fire doors. At the time of the fire, most of these doors were closed which explains why the fire did not involve much of the west section of the mill.

The flames quickly involved the cellar then spread up an elevator shaft and via open windows to the upper floors. By the time the first companies arrived on the scene the basement, first and second floors were heavily involved.

The first alarm was received from Box 1541, Amsterdam Avenue and West 132nd street, at 12:45 p.m. Responding were Engines 37, 69 and 80; Ladders 23 and 40; Battalion Chiefs Schneible and Singer (acting) and Deputy Chief Kihlgren. Before this force could get into operation the fire extended throughout the entire east section of the mill and burst through the roof.

Fire jumps street

At 1:00 p.m. Chief Kihlgren radioed for a second alarm and reported the intense heat was hampering operations. At 1:01 p.m. he radioed for a third alarm and advised the fire had jumped to the south side of 132nd Street. He also ordered by radio that all second alarm companies respond to 133rd Street to prevent extension of the fire.

The buildings on the south side which became involved were numbers 508, 512 and 516; all six-story brick tenements, 30 feet by 80 feet, in the early stages of demolition.

At 1:05 p.m. a large metal water tank located above the roof of the blazing factory crashed to the ground bringing most of the building with it. This spread fire in all directions. Immediately a fourth alarm was ordered and the Manhattan fire alarm dispatcher ordered all units to refrain from using radio except for urgent traffic.

With the water tank collapse, the fire spread to a seven-story brick building about 250 feet by 100 feet, located to the west of the factory; also to a five-story brick tenement 80 by 130 feet, separated by a vacant lot on the east; and to six five-story brick tenements on 133rd Street to the north of the original fire. Most of these buildings were included in the demolition operations but the remainder of the neighborhood structures, now seriously threatened, was fully occupied.

It was necessary to immediately search exposed inhabited buildings and remove the occupants as the fire spread.

The fifth alarm was ordered at 1:09 p.m. The five alarms called into action a total of 18 engines and six ladder companies. At 1:32 p.m., four additional engines were ordered to the scene and Engines 2, 14, 18 and 55, all of lower Manhattan, were dispatched. At the same time 80 probationary firemen and their instructors, under the command of Dep-

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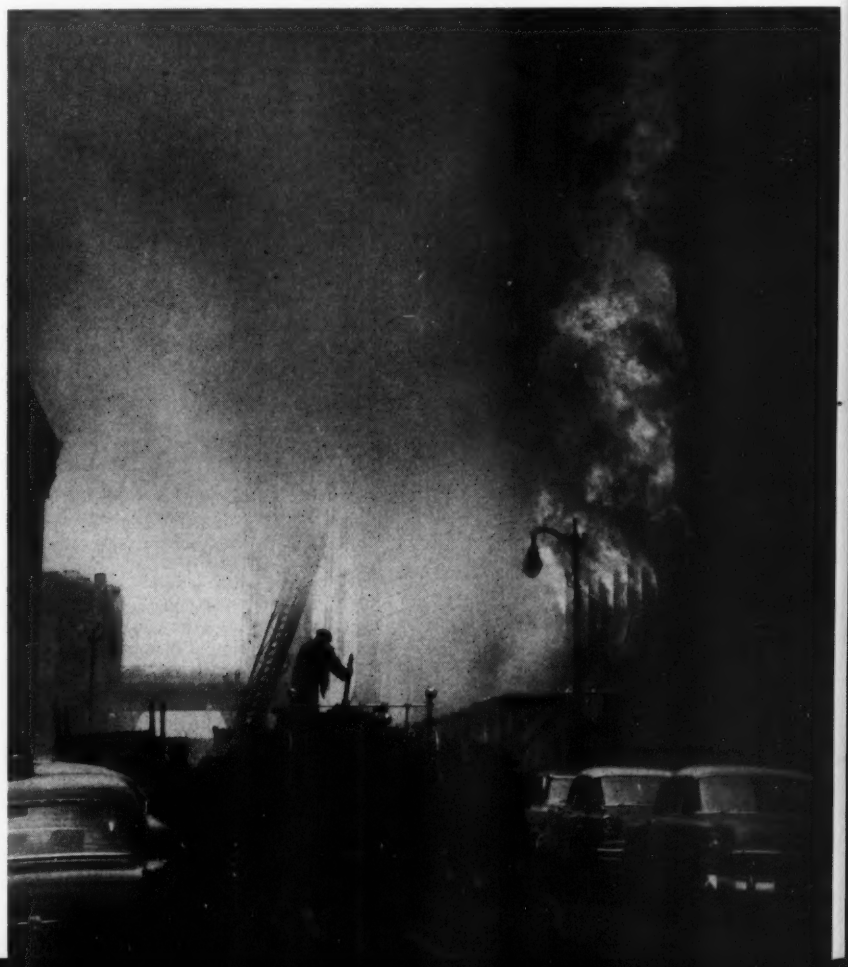
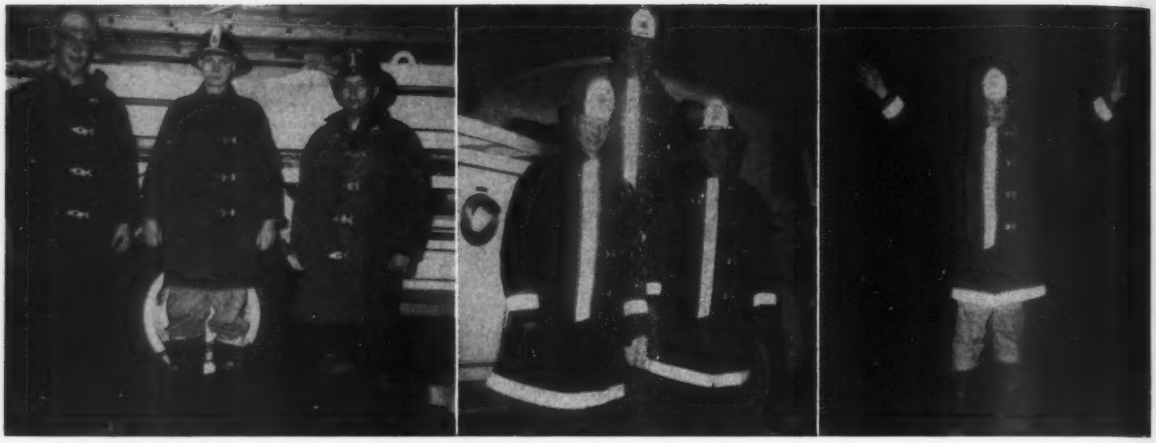


Harlem five-alarmer as first-due companies found it (Box 1541). This view on 132nd Street was taken only minutes before that shown on the cover. Note dry lines, setting up for deck gun and ladder pipe and crowded thoroughfare —*Photo by Paul Thayer*



Left: Three fire fighters in conventional work clothes. **Center:** How they look in turnouts treated with reflective material. **Right:** Reflective treated work apparel speeds and safeguards traffic control and fireground signalling

The Fire Service Has a New Helpmate — — Reflectivity

Possibilities for improving safety and efficiency in fire suppression are limitless

MAN'S INHERENT INABILITY to see in the dark has been providing problems and producing hazards since the caveman moved into his cave at night and built a fire at the entrance to protect himself from nocturnal animals. His ancestor developed the portable flaming torch to light his way at night; then came the lantern, the headlight and flashlight.

Darkness to the fireman is an even greater barrier and hazard than to many others because the fireman must work quickly, effectively and with caution regardless of light and conditions. Much of his work involves rapid location and identification of particular places and objects—the location of the emergency to which he's been called; the location of hydrants and sometimes identification of the type of hydrant or its water pressure; locating storage tanks or pipes and identifying the contents; finding shutoff valves in industrial plants. These are merely a few examples of the fireman's preliminary analysis of an emergency situation required before he can swing into action. And darkness hinders. Then, on the fireground there is the importance of personal identification of fire fighters themselves—of determining who's who, and where, when they're wanted.

A few years ago another development in man's attempt to overcome his inability to see in the dark took a step in a new direction. Besides trying to develop lights that would throw their beams farther, he came up with the idea of "lighting" the object he was seeking by making it reflective. It would collect the rays thrown out by a light source—headlight, flashlight, hand light—even though these rays might be weak from traveling some distance through the atmosphere, and return the rays with increased intensity to make the reflectorized object brightly visible.

It's done with reflective sheeting or reflective liquid.

Reflective sheeting

Reflective sheeting, colled "Scotchlite," is a tough, durable plastic sheeting with an optical system built in. The optical system is composed of millions of tiny glass lenses—so tiny that a pile in the palm of the hand looks and feels like talcum powder. A protective layer of clear plastic protects the microscopic lenses.

On the back of the sheeting is a tough adhesive which sticks to a surface for years, even when exposed to weather conditions.

Reflective liquid

Reflective liquid, called "Codit," has a similar optical system, but it is suspended in a liquid. It is brushed or sprayed on any rough or porous surface. It was introduced only two years ago.

Uses—where and for what

These two reflective products are designed to make the necessary object brightly visible to the searcher, and if necessary, identify the object for him.

Identification is accomplished by "overall" or "surface" reflectorization when the shape of the object will help identify it. The sheeting or liquid is spread over the entire surface which gives it identity by familiar shape.

One example is the traffic sign. The familiar octagonal shape of the Stop sign, or diagonal shape of the Warning sign, are seen and identified at night to the approaching motorist because the reflective sheeting covers the entire surface revealing the familiar shapes.

A second method of identification, used more often by fire departments, is color coding of the object to be identified. Amplifying on the example of the traffic sign, not only is the sign identified by the familiar shape but also the familiar color. The Stop sign which is red by day is also red by night; the warning sign which is yellow by day is also yellow by night.

Color coding tanks, pipes and other

Left: Many men have been killed or injured in tailboard accidents. Every rider should wear reflective work clothing. **Center:** From above or below, reflective gear helps spot personnel, as shown by this fire escape action shot. **Right:** Night ladder work at best is hazardous. Use of reflective material helps to minimize the danger to operating personnel—*Photos by John Ward, Campus Fire Station, Stillwater, Okla.*

equipment is not a new technique, but the use of colored reflective tape (the same as reflective sheeting but slit into narrower widths) is a more recent development.

When an industrial plant is blacked out due to fire or other emergency, or smoky atmosphere is veiling visibility, the fireman can swing a hand light around the plant to locate and identify various objects, such as exits, shaftways, stairs, etc.

Reflective tape or other reflective markers, identifying house shutoff valves, sprinkler connections, extinguishers, as well as the hazardous contents of pipes and tanks, will catch the rays of the hand light and return them in the coding color to the searcher. Location and identification are rapid, saving precious seconds.

Some plants, such as Alcoa's plant in Chicago, are recognizing that these precious moments spent in searching for important locations during emergencies might save lives and property, and are re-signing their entire establishment with reflective signs—from telephone and stretcher locations, to extinguisher and exit signs. They are also using reflective traffic and direction signs on the plant grounds which aid emergency movement of vehicles as well as routine traffic during daily operations.

But these are applications of reflectivity which the fire department can only recommend. There are other phases of the fire fighting operations where the fire department itself can utilize reflectivity to advantage.

Personal safety

One of the more common applications of reflective sheeting throughout the nation's fire departments is on the rubber and other coats of firemen.

Recent surveys by FIRE ENGINEERING indicate an increasing call upon the producers and distributors of firemen's turnout and work clothing for reflective identifying bands and insignia. Such marking is called for, both for the old rubber coats and the newer types of treated canvas and other material.

Strips of silver reflective tape across the back, around the hem, cuffs or arms, help the fire officer keep track of his men's activities and their location. If a man is unaccounted for, the search can be shortened by the vivid reflection seen through smoky areas by a searcher with a hand light (the silver reflective tape is 100 times brighter than the whitest white paint).

It also provides increased safety for men working in the street as emergency vehicles arrive. The lights of the approaching vehicle make the reflective tape brightly visible to the driver.

Helmets and boots can also be marked for the same purpose—protection from traffic at the scene of the nighttime emergency, rapid location of a man in case of accident and helping officers keep track of their men.

A number of departments use different colored reflective stripes on their fire helmets for identifying hosemen, laddermen and salvagemen. Company numerals also are now being fashioned of such reflective material.

Equipment

From the time a piece of fire apparatus leaves the station until it returns, it is vulnerable to accidents, especially at night when any vehicle is less readily seen. Reflective sheeting or tape can be applied to equipment to provide greater seeing distance for approaching drivers.

Reflectorization of automobiles or trucks can be minimal or extensive.

Some examples: Applying reflective red tape—1 or 2 inches wide—to the body or bumper of the vehicle; applying larger sheets of reflective sheeting to the body; applying the local fire department emblem or lettering and numerals in reflective sheeting.

The advantage of the latter application is that many fire department vehicles have lettering, numerals or emblems on the sides and back. If these portions are reflective, it provides increased nighttime visibility for the approaching motorists on all sides of the vehicle. One of the most recent applications of such reflective material has been in the marking of company and apparatus numbers on the cab tops of fire vehicles. This was occasioned by the need for identifying apparatus during far-flung operations such as the New England and Pacific Coast field and forest fires where planes and helicopters were employed for aerial survey and fire fighting direction. Colors

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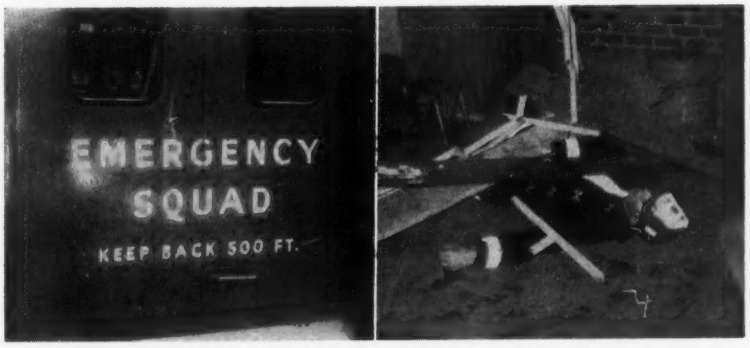


Left: Emergency squad of Storm King Fire Engine No. 2 is completely lettered in brilliant yellow Scotchlite.—*Photo by Timothy G. Stillman.* **Right:** Injured personnel can be spotted much more quickly in the light of a flashlight or hand lamp, when wearing reflective treated apparel —*Photo by John Ward*

New York Fire Department Supervising Engine Unit 1 with staff and part of equipment carried or currently being evaluated. Personnel are (left to right) Lieutenants George Durr, Burton Clark (since promoted); Fireman William Doyle; Captain Thomas D. Ryan and Lieutenant Thomas Clements

Specialization Keynotes Operations of Supervising Engineer Units

A detailed analysis and description of the duties and operations of New York's Supervising Engineer Company No. 1

By CAPTAIN THOMAS D. RYAN

Supervising Engineer, New York Fire Department

INDUSTRY AND MANAGEMENT have recognized the fact that this is an era of specialization and from the standpoint of efficiency, it is wise policy on their part to endeavor to find the right man for the right job. Furthermore, the quality and quantity of this individual's work output will be considerably enhanced if he has a working knowledge of those operations related, directly or indirectly, with his specialty. In short, for each special job operation they seek the man who possesses specialized skill, and in addition, what is generally termed "a well rounded background."

Of late, progressive fire officials in increasing numbers have recognized this cardinal principle in their selection of men for specialized activities or units. No longer is proficiency in automotive mechanics the sole criteria in choosing driver-operators of pumpers (variously called motor and pump operators). While possession of such automotive knowledge and skill is a definite asset, candidate selection must also take into account such qualifications as a working knowledge of practical hydraulics, pump theory and operation, skill at the wheel and, because of the burden of the operator's heavy responsibilities, correct driving attitudes and habits.

Applying this thought to another branch of the fire service, men assigned to rescue squads need far more than a working knowledge of first aid. The situations they encounter prescribe the use of cutting torches, heavy-duty rescue equipment and a variety of special tools as well as resuscitators, masks, etc.

Today we find a greater number of specialist personnel and specialized units being established whose duty, regardless of rank, is mainly supervisory. It is with one such group—that of Supervising Engineer Company No. 1 of the New York City Fire Department—that this article deals.

Because of its accomplishments, the work load of the unit has constantly been expanded, its quota of personnel increased and its physical facilities improved during recent years under the leadership of the department's progressive fire commissioner, Edward F. Cavanagh, Jr., and its far-sighted chief of department, Edward Connors. The unit itself

is incorporated in the Division of Fire Fighting Equipment which, in turn, is commanded by Chief Supervising Engineer Harry M. Irwin.

Organization and background

The department's records disclose that the unit was originally established some 67 years ago, on June 6, 1889 to be exact, when Department Order No. 7 designated two members as supervisory engineers with the duty of responding to all third alarms "to supervise the working of all engines at fires and to give such instructions as they may deem necessary for proper handling as well as for best delivery of water." These original men in the unit were informed that "cannel coal of the purest grade will not clinker on grate bars, when used in the furnace of the boiler." They were further instructed to make special mention in their reports of all cases "where the coal is found to clinker, stating to what extent and its effect on the steaming of the boiler." Stemming from such unique and antiquated responsibilities, the unit's fire operations and other duties have been expanded to such an extent that today it occupies a key post in the over-all plan of the department.

At present the staff of Supervising Engineer Company No. 1 comprises 16 members, including one captain, four lieutenants and 11 firemen. Unit No. 2 in the Marine Division, is mainly concerned with repairs to our fireboats and is not assigned to respond to alarms, although it may be called in an emergency.

Actual engineering background on a formal basis is not a prerequisite for members in order to be assigned to Unit 1. Instead, the emphasis is placed on ability in practical situations, with the men possessing qualifications not commonly developed in the fire fighting personnel.

First, its members must be endowed with mechanical aptitude above the average and more than ordinary knowledge of physics, particularly in the field of applied mechanics. Considerable and varied backgrounds in fire fighting are desirable assets which are gained through assignments to different fire stations, including both engine and ladder companies. While a definite period of experience cannot be stipulated, since some men mature more quickly than others, it is preferable that applicants have several years behind them, in order to face up to some of the situations the unit encounters. Present policy dictates that men should not be transferred into the unit until their backgrounds and records have been examined and they have had an observation period of several months to determine whether or not they measure up to the required standards, and whether they adapt themselves to the wide variety of work and the heavy work loads.

Because of the highly specialized nature of the work, its officer personnel for the most part have graduated from the rank of fireman in the unit. It is manifestly unfair to take an officer whose experience has been mainly in one specific company in the department and expect him to show immediate familiarity with all types of apparatus and equipment. In the New York Fire Department there are over 800 pieces of apparatus including 129 different kinds. Even confining this topic to aerial trucks and pumpers, we find over 25 different types or makes.

In order to keep "on its toes" and overcome the element of forgetfulness, besides the field training program, mentioned later on, a daily drill session is held, using the apparatus in the shops for repairs. The unit is quartered in the same building as the shops of the Division of Repairs and Transportation.

To supplement their broad practical backgrounds, each officer of the unit has been given specialized training in methods of teaching, with particular stress on the proper conduct of classes and drills. Besides standardizing the methods of instruction and the operation of each piece of equipment, officer personnel have attended various outside fire schools and conferences.

After fire is under control, Lieutenant William Doyle (center) supervises members of unit in lowering aerial ladder prior to repositioning apparatus to permit resumption of traffic on main thoroughfare. Such duties entail a working knowledge of all fire apparatus (note fixed connections for ladder pipe)

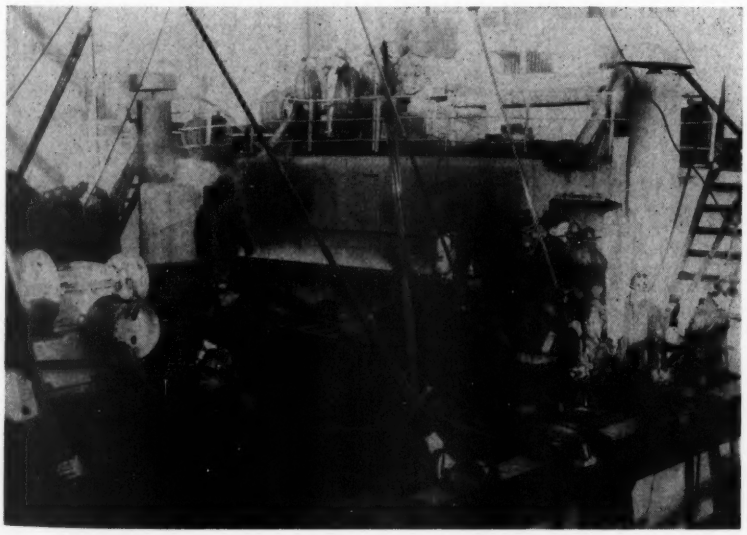
In addition to instructional and maintenance manuals covering all pieces of fire apparatus presently in service in the department which are contained in the office of the supervising engineer, the unit makes fullest use of the department's extensive reference library located in the same building. All published data bearing upon the manufacture, maintenance and operation of the department's varied equipment is studied for new and progressive ideas which may be incorporated in the unit's instructional material.

Unit has many duties

While appropriately and primarily the unit is concerned with apparatus and water supply, the duties of its staff at a fire or emergency may range from such ordinary assignment as giving a progress report over the radio for the chief in charge, to assisting a company or commanding a group in holding a difficult position.

As previously mentioned the supervising engineer unit covers the entire city on: (a) Second or greater alarms; (b) wherever special apparatus is used; (c) all unusual incidents.

Its members first report to the chief in charge with information on the water supply, as follows: (a) The sizes of water mains being used; (b) nearby larger mains, if any; (c) hydrant pressures, both static and residual; (d) other unusual factors affecting operations. With this information at hand, it is frequently possible to spot pumpers more intelligently in order to take advantage of larger



Supervising engineers helped to alleviate a dangerous situation when the S. S. Manipur, her hold flooded to extinguish a stubborn fire in jute, hemp and sisal, threatened to capsize. Dewatering operation retained vessel's center of buoyancy

Fireman James Regan of Supervising Engineers Unit 1, perched atop an aerial ladder at threatening five-alarm warehouse fire to release jammed ladder pipe

size or cross-connected mains and thereby avoid what is termed "running away from the water." These factors pertaining to water supply are, of course, ascertained on approach to the fire scene. Apropos of this, members have through experience become familiar with problems which are peculiar to certain sections of this city and so in many cases are able to suggest solutions to circumvent them. As a concrete example, following the disastrous 11-alarm fire in the Williamsburg section of Brooklyn in 1955, it was found that, although Brooklyn and New York were consolidated nearly 60 years ago, the water mains of the adjoining boroughs of Queens and Brooklyn had never been cross-connected at this point. As a result, the tremendous flow of water through the single Brooklyn feed main increased friction losses to a point where pumpers were operating near a zero intake pressure. In the event of a similar fire in this area, it would have been necessary to relay water from one water main system across the borough boundary line to the other mains. Following the unit's investigation, a large specially valved cross connection has been installed by the Department of Water Supply, Gas and Electricity at a point in this area where the two boroughs join. Thus, in the event of a serious fire, water can readily be diverted across the boundary line.

In addition, maps of the layouts of mains in certain parts of the city are provided by city agencies and carried on the unit's apparatus. These are consulted while responding, particularly if the fire is gaining headway, as gleaned from the radio progress reports. Because of such foreknowledge, it was practicable at the nine-alarm lumber yard fire in Jamaica, Queens, to locate pumpers on a large feed main some two blocks distant from the fire and more effectively supply water to the pumpers nearer the fire.

At fires a continual check is maintained on available pressures on the mains and, as indicated, pumpers are either positioned on other mains of greater capacity or emergency crews of the two city water agencies are called to open up additional valves or to cut in additional pumps to build up lagging pressures.

A quick analysis of all these factors affecting water supply is given to the ranking officer at the fire when reporting in, and at least one member of the unit remains nearby for consultation in assigning incoming companies to the most advantageous positions for their apparatus, indicating which pumper should be used for the shortest stretch and most efficient operation, and coordinating all companies involved in any relay operations. The other members of the unit generally split up in order to make the rounds quickly and check all working apparatus.

Checking apparatus

In the inspection of each piece of apparatus, all major points of its operation are carefully covered, including:

1. **The motor**—Generally through observation of its dash controls
   a. Temperatures: Proper operating range, correct usage of direct or indirect cooling systems
   b. Ignition systems: Generator, alternator, rectifier, battery, proper usage of selector switches for ignition and accessories
   c. Oil pressures: As indication of trouble in motor lubrication system
   d. Gas and oil: Sufficient for present and anticipated needs
   e. Motor speeds: Tachometer reading indicates whether or not motor is exceeding the speed range wherein it delivers its maximum horsepower output
2. **The fire pumps**—The inspection starts in the cab to see that road drive is disengaged and the transmission stick is locked in the proper gear. It then encompasses:
   a. Proper position of stage valves, A and B valves, series-parallel valve, cross-over valve or whatever term is used
   b. Churn valve: Loss of efficiency is prevented by its correct usage
   c. Governor or relief valve: Must be working properly and correctly set
3. **Pump pressures**—Operating pressures are checked in order to prevent injury to personnel and provide most efficient streams.
4. **Stretching of lines**—Efforts are directed towards preventing laying of hose unnecessarily. Where possible, the apparatus is used in making the stretch.
5. **Placing of apparatus**—All apparatus must be advantageously positioned for immediate or possible usage. If it is definitely not to be used, it is removed out of the path of traffic.

Drafting operations

The technicalities of drafting operations, especially when of considerable magnitude, with falling tides, foul water, etc., may test the resources and skill of any municipal fire force. At such times close and efficient supervision of operations is essential.

Standpipe, sprinkler, yard hydrant and foam supply systems

Because of their technical nature and the magnitude and complexity of involvement, the job of insuring safe and effective operation of such systems is generally delegated to the supervising engineering unit. A notable example was the situation created when a plane crashed into the 79th floor of the Empire State Building, causing a break in the standpipe riser below the fire floor. The break was quickly discovered and that section of the riser isolated and water by-passed around the break, largely through the efforts of the officer in charge of the supervising engineer unit at the time.

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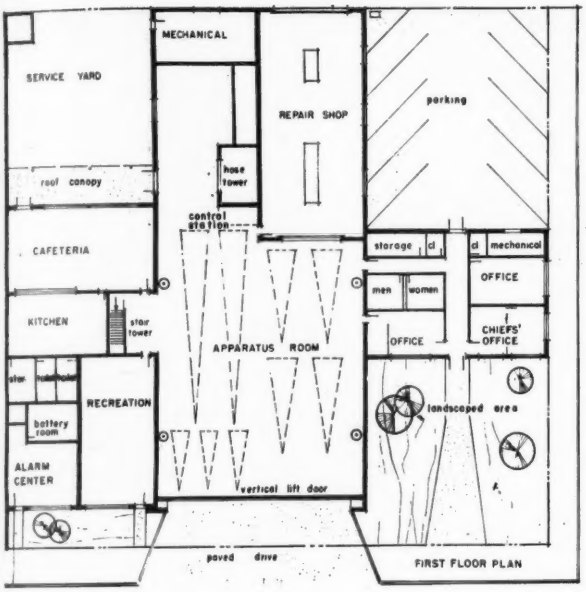
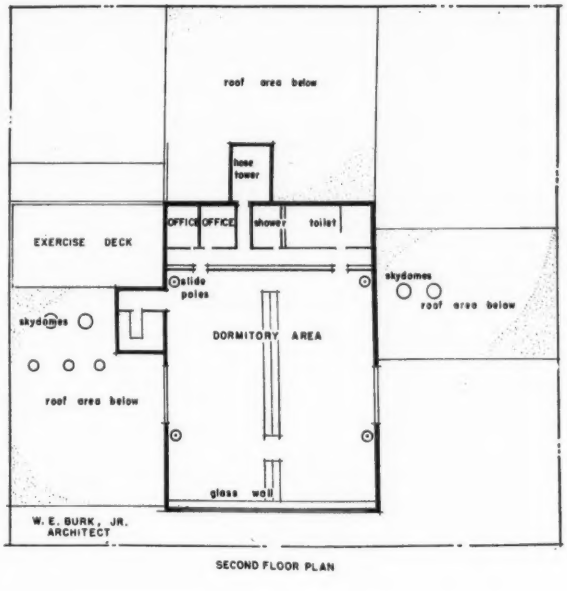




Modern Headquarters Station in Albuquerque

ON NOVEMBER 26, 1956, the Albuquerque, N. M., Fire Department occupied their new completely air-conditioned headquarters fire station, constructed of cement block, brick and steel. Floors in all living quarters are covered with flexible tile. The kitchen has ceramic tile and all apparatus floors are finished in troweled concrete. All lighting in the building is diffused fluorescent in ceiling fixtures and skydomes provide additional daylight in all of the interior rooms.

The first floor contains the apparatus room with space for two pumpers, an aerial and the chief's car abreast. Other vehicles may be accommodated behind these units. In addition, there is a completely equipped cafeteria-style kitchen and dining room; hose tower; store room; fire alarm center and battery room; and office space for the chief, assistant chiefs and the Fire Prevention Bureau.

Elevated watch desk

The watch desk is located in the control room at the rear of the apparatus floor and is elevated about 10 feet. The man on duty has a clear view of the entire room and doors at all times. The two apparatus doors may be electrically operated from the control room or manually from the floor. The two-section vertical lift doors are constructed of metal with glass panels and can be fully opened in about 14 seconds. Alarms are announced by means of a Vocalarm system and by standard gongs. An intercommunication system is provided throughout the entire building.

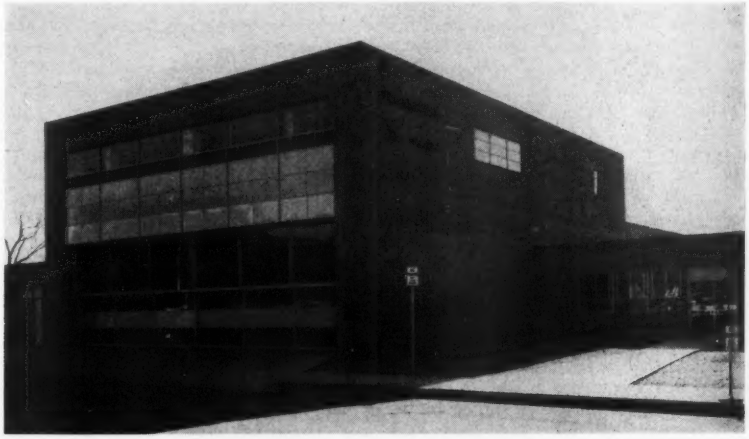
The repair shop is separated from the apparatus room by a 16-foot roll-up steel door. A similar door is at the rear of the shop to provide entry of apparatus from a wide alley. The shop area is large enough to hold a tractor-trailer aerial with excellent work space on all sides. Two hydraulic lifts are provided and a power ventilating system permits engine gases to be exhausted to the open air. A parking area for the firemen's cars adjoins the shop in the rear of the administration offices.

The second floor provides dormitory space, two officers bedrooms and wash rooms. An exercise deck is constructed on the roof space over the cafeteria and is reached by a doorway from the stair hall. The front of the dormitory is a solid expanse of glass. Sliding poles are located in each corner of the large room.

The new headquarters is one of eleven fire stations in the city. Its total cost including land, building, parking areas and furnishings was $390,000.

Architect W. E. Burk, Jr. designed the modern structure and the general contractor was the Sproul Construction Co., both of Albuquerque. □□

The Editors appreciate the cooperation of Theodore A. Rosenwald of Albuquerque who supplied the photos and information on the Albuquerque fire station.



Albuquerque's new air-conditioned headquarters

It is not often you see monitors used on roofs. This six-alarm Philadelphia fire, involving Publicker Industries, is an exception. Six monitors "on deck"—five in action—help to confine explosive fire—*Philadelphia F. D. photo by Robert Kennedy*

What Progress in Master Stream Devices?

WHEN YOU ANALYZE the nation's fire losses you come up with the plain, cold fact that every fire officers knows—or should know, to wit: that over *60 per cent* of the destruction of property by fire in this country is caused by *only one-third of one per cent* of the total number of fires.

This unbalanced loss ratio has been maintained, with various slight modifications, from year to year. It is testimony to the repeated claims of such authorities as the National Board of Fire Underwriters, the National Fire Protection Association, Factory Mutuals and other insurance groups, that—barring the Utopian situation when buildings and contents will be so built that they *cannot burn*—the place upon which to center our fire protection fury is these big fires, the conflagrations of $250,000 and over.

It is hardly necessary to attempt to analyze the reasons for these costly fires; that has been done by these authorities and others concerned with our disgraceful fire losses. They have held post mortems on these blazes and come up with the answers.

The one with which this study deals is concerned with the use or rather, lack of use of heavy streams upon so many of these fires.

Among all contributing causes, this single detail may not appear to rate so high on the totem pole of protection as, for example, sprinkler protection. Furthermore, it is true that many of these fires were quite beyond any hope of control, let alone extinguishment, by the time the fire fighters arrived on the scene, regardless of the fire control facilities they brought with them. But by and large, in many cases, even when they did get on the job, they were licked because they could not come to grips with the main body of the fire; or else they were unable to set up protective streams and water curtains to cover exposures and prevent extensions.

To borrow the words from the NFPA's *Conflagrations in America Since 1900*, "Experience has shown that heavy streams in large numbers are essential to control a conflagration in congested areas . . . ordinary streams from hand lines are not only ineffective on a large body of fire, but it is frequently impossible for men to get near enough to use them effectively due to the great heat . . . heavy streams are necessary to reach the burning material and to form a water curtain to protect exposures from the radiated heat. Even the largest fire streams do not have effective range of much over 100 feet, and there is often no possible method of applying water to the burning area."

This study is not so much concerned with master streams, per se, as with those devices which create such streams and which for want of a better definition are designated master stream appliances.

The ability of any fire stream to reach its target of fire depends upon a combination of factors, beginning with the source of water supply and winding up at the tip on the pipe or nozzle. In the effort to accomplish greater reach and penetration of fire streams, in order to "hit" the fire and "darken it down," fire fighters have continually sought to improve the effectiveness of the devices—most of them mechanical—which enable them to control stream characteristics such as direction, volume, pattern and so forth, with the least effort and risk to themselves. In this endeavor they have had the assistance of fire equipment manufacturers and their engineers.

Just as no one has as yet produced the "perfect nozzle," so no one has created the perfect master stream appliance or device. But if we have not reached perfection, we have at least made substantial progress, as the following pages indicate.

Master streams call for larger hose, greater pressures and consequently some mechanical means of controlling and operating them than convential streams. These accessory devices take different forms, but most of them fall into one or two categories; stationary or fixed, and portable or mobile. Some, of course, are designed to serve as both. And shortly there may be another diversification having *direct, or indirect* control and/or manipulation.

Not all so-called heavy stream devices are "mechanical." The first such appliances were merely simple ways of hold-

ing or anchoring the heavy playpipe or hose nozzle by means of a metal "stick" or other form of brace or counter balance. One of the first, if not the first, such appliance was the Eastman holder, which became part of the Eastman deluge set which is still widely used throughout the country.

Other type hose holders and pipe holders include Eureka, Perfection, Paradox, Peerless and Invincible. They were employed where mobility was a factor. In all of these holders the siamese, or inlet connections, were not integral with the device itself.

Requirements of master streams

What are the essential characteristics of master streams and master stream appliances? The most important may be set down as:

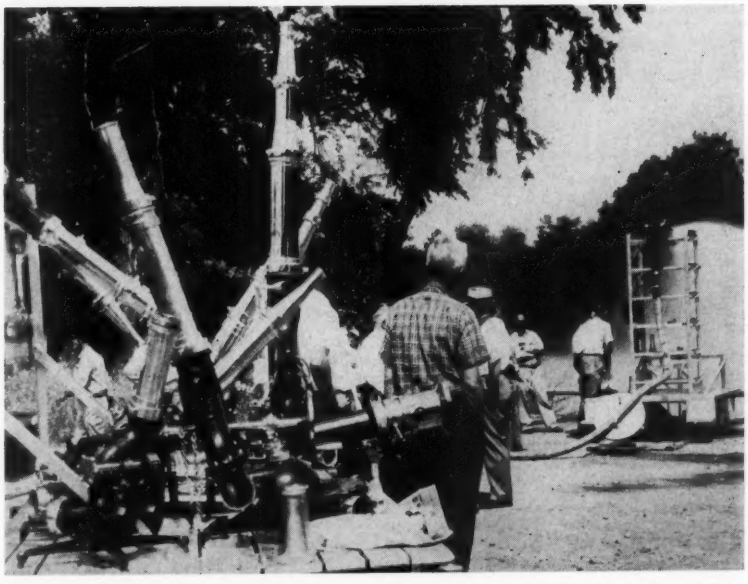
1. **Reach.** The fire stream to be effective must reach the fire. The reach of fire streams, particularly of hand lines is limited. There comes a point in its travel from the nozzle where much of the water will fail to get to even the fringes of the fire, or to penetrate a window or opening. Reach is limited by a number of factors such as discharge, the angle of the stream, the characteristics of its nozzle and the nozzle holding appliance (turret pipe, deluge and deck gun, etc.).

2. **Penetration.** The main body of water of a fire stream must get to the burning material or close enough to consume BTU's. The heated materials, of whatever nature, must be cooled down to a point where they will no longer emit combustible gases, or support combustion. Penetration may be blocked by obstacles such as partitions, or improper stream angularity and trajectory. Obviously, other conditions being equal, the stream with the greatest striking power will develop the greatest penetration. But there again, many other contributing factors must be considered such as size, volume and pressure of the stream; extent to which it breaks up; effect of wind; and of course the human element.

3. **Angularity.** Reach and penetration are affected by angularity of the stream. The more nearly horizontal the stream bears, the greater its penetration. This factor was strikingly demonstrated during the conflagrations in the London Blitz by the use of the turntable ladders which permitted the master stream devices to be operated at or approaching the most effective trajectory, off the vertical. One reason for the obsolescence of the water tower (FIRE ENGINEERING July 1956) has been its inability to be used other than in a vertical position, which limited its application and made it more susceptible to the reaction force of the stream.

4. **Sweep.** Using the modern aerial ladder it is possible under suitable conditions to place the nozzle directly in the window and to sweep the floor or fire area. The advent of all-mechanical remote

Philadelphia Fire Department's "Giant Deluge" operating at Gimbel Brothers fire, 1957. Note powerful 30-degree fog pattern on hydraulically operated monitor and additional conventional type guns with stacked tips—*Photo by Robert Bartosz*



Master stream nozzles, assembled for tests by the NFPA Fire Department Equipment Subcommittee on Heavy Stream Appliances at Rochester, N. Y. Manufacturers' nozzles tested were Akron Brass Mfg. Co.; American LaFrance Corp.; Samuel Eastman Co., Inc.; Elkhart Brass Mfg. Co. and Wooster Brass Div., Fyr-Fyter Co.

Master stream devices have been bulwarks of fire departments for well over 50 years. Shown is Boston super-deluge master stream unit, circa 1900. Six-inch line of Eastman deluge set was fed by four 3-inch lines connected to salt water system supplied by fireboat. Striking range of stream was over a city block

Master stream appliances such as these two portable deluge guns are used to advantage in hot spots where hazards are too great for personnel. Scene at four-alarm Barrett Company fire, Philadelphia, where a battery of these monitors confined dangerous fire without injury to fire fighters —*Philadelphia F. D. photo by Robert Kennedy*

To evaluate reach, continuity and other stream factors, three prominent makes of deluge sets were tested under identical conditions by the New York Fire Department Supervising Engineers. The department's new pumpers will all mount portable monitors. Contact with fireboat source of supply was maintained by walkie-talkies

control of the modern ladder pipe greatly enhances this advantage. The modern metal ladder is built with sufficient strength to permit ladder pipes to be placed at the tip of the fly ladder and at an intermediate position. With the ladder at a fair angle from the vertical, the full heights of these metal ladders may be taken advantage of.

5. Control. An important factor in master stream operation, particularly from a ladder pipe, or conventional nozzle operating off a ladder, is the ability to determine where the stream is going, and how well it is striking its target. This is difficult under normal smoke and fire conditions where the operator of the stream device is on the ground. An excellent solution, which had its origin abroad, is to locate the operator at the nozzle location on the ladder tip where he can more easily tell whether his stream is getting penetration to the affected area or being wasted. In this position, also, an observer-operator can regulate the type or kind of stream, from full fog to straight stream as desired. Should it be impractical or unwise to station a man at the ladder tip, it is now possible to regulate the pattern of the stream as well as direct its vertical sweep by means of new remote control power units, electrical and hydraulic, as described later on.

This emphasis on ladder pipes and ladder master streams should not becloud the fact that this remote control and direction innovation can be applied with equal success to portable turrets or deluge nozzles.

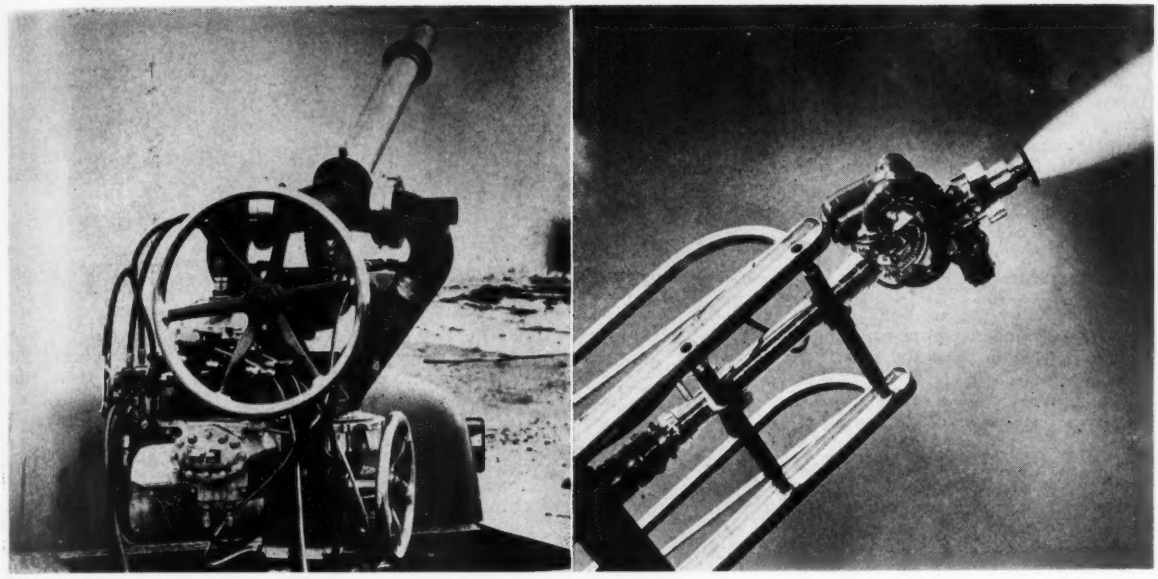
Many authorities consider this mechanical, remote control of master streams to be the most significant development of a generation in hose stream practices and stream devices. One cannot venture to evaluate the future development of this feature only now getting into commercial production.

Of course there are other factors which influence master stream effectiveness—details such as duration (the length of time the stream is held on the target); location (placement of stream to gain greatest effectiveness); water supply—and the means of delivering the required volume to the master stream device (which calls for pumper capacity and hose of adequate size); and the ability of the operators of the master stream itself (training in powerful stream appliances should be undertaken by all fire companies).

Application

Originally, powerful stream devices were limited to certain specific fire apparatus units and fireboats. Their use grew essentially with the increase in pumping power and stream striking power following the birth of the paid fire service and the acceptance of steam power.

As buildings increased in size and height, and as fire hazards of all kinds grew in number and severity, it became increasingly necessary to develop "defense in force." This was based upon getting all the water possible upon the



Left: Hydraulic controls adapted to largest size deck pipe is shown in this illustration of monitor on Memphis Salvage No. 2—*F. N. McIntire Brass Works photo.* **Right:** Remote control electric ladder pipe is operated by push buttons located on aerial turntable pedestal. Small but powerful motors enable operator to control elevation as well as pattern of 500-gpm fog nozzle—*Akron Brass Mfg. Co. photo*

fire or exposures, or setting up water curtains to confine the fire.

To overcome attendant problems of long hose lays, heavy friction losses, high pressures, burst hose and the like, it was found expeditious to siamese several lines into one, preferably as near the fire as possible, and operate that powerful stream where it would do the most good, using either some form of portable or fixed monitor or turret.

Modern metal aerial ladders are supplanting the old unwieldy, cumbersome water towers. This Rochester ladder has permanent supply pipe to ladder pipe mounted at tip of first section. In addition, it mounts a fixed deck gun at right rear of the chassis. An additional removable ladder pipe, with or without remote hydraulic control, may be affixed at tip of fly section

The deluge set

The deluge set was probably the first complete master stream assembly, if not complete mechanical unit, for fighting fires which have attained considerable headway and where powerful streams must be delivered from points some distance from the fire. The deluge set makes it possible to operate such streams at high pressures and relieve the fire fighter of the dangerous and difficult job of holding the nozzle. It has the further virtue of light weight and compactness.

Deluge sets in use today for the most part consist of the pipe holder and the nozzle attached to a short length of large diameter hose. On the other end of this hose is a siamese fitting with two, three or more inlets.

Deluge sets may have 3½-inch or 4-inch hose with two, three or fourway siamese, having 2½-inch inlets and 3½-inch or 4-inch outlet, and a section of 3½ or 4-inch hose leading into the pipe. Provision is made for nozzles up to 3-inch diameter. The siamese fittings are of the clapper valve type, so that in the event that one of the lines bursts, the coupling blows off, or otherwise opens up, the set will not be out of service.

Portable monitors

Portable monitors are in reality refinements of the original deluge sets. By attaching the nozzle directly to the siamese connection (regardless of the number of inlets) and eliminating all intermediate hose, the heavy stream may be operated as desired. Such integral construction improves friction loss characteristics. Also, unlike the deluge set, the portable monitor can serve as a fixed gun.

Portable monitors may bear other designations such as deluge guns, portable turrets, portable deck guns and even the trade name of some manufacturers. They vary in style from a small device with a single 2½-inch inlet to master models with four inlets. Tips supplied with the appliances may vary in size from 1⅛-inch to 2½-inch and capacities may be rated from under 400 gpm to well over 1,000 gpm.

Control of the nozzle elevation, and its rotation may be by hand or by means of a worm and gear, or combinations of both. It is characteristic of these devices that they are capable of maintaining their position once they are set up, only one man being required to control all operations of the stream. A safety notch or lock is usually included in the elevating mechanism in order to maintain the nozzle at the minimum angle necessary to keep the appliance stationary. If the elevation is less than the safe angle maintained by the lock, the nozzle thrust under pressure may be sufficient to cause the entire appliance to move backward and possibility whip out of control.

Portable monitors have become quite popular in recent years as a means of producing master streams in many departments. A common method employed is to mount the unit on a pumper or hose truck, generally over the hose body in the vicinity of the pump where it can be used as a wagon pipe if it is not desired to remove it from the apparatus. Its portability permits it to be used in confined or restricted areas where a piece of apparatus mounting a similar or fixed gun could not be used.

As mentioned previously, some of the

various devices within this category are known by their trade names. These may include the Akron Brass Mfg. Co.'s "Multiversal Deluge;" Wooster Brass Division of the Fyr-Fyter Co.'s "Geyser Deluge;" J. M. Baker Pattern Co.'s "Portable Universal Turret Pipe;" the Elkhart Brass Mfg. Co.'s "Portable Deluge Nozzle;" Samuel Eastman Co.'s "Eastman Deluge Gun" and F. N. McIntire Brass Work's "Invincible Portable Turret."

Fixed monitors

Within the category of fixed monitors are included various types of turret pipes, deck guns, wagon pipes and other permanently located master stream devices. These are almost without exception, major appliances capable of developing capacities considerably over 2000 gpm. The smaller models may be manipulated by hand or worm and gear. Nearly all of the larger types are gear-controlled. It is reported that some of these may be remotely controlled.

Water is supplied to fixed monitors by direct pipe connections from the pump of the apparatus (or boat) on which the master stream devices are mounted. Various forms of siamese connections through which supply lines may be fed are also encountered, some mounted on the rear, some on the side of the apparatus. Where the heavy stream device is directly connected to the pump a control valve is usually included on the line to enable the operator to control the water flow.

Fixed monitor nozzle installations on apparatus (which may include ladder trucks as well as pumpers and special master stream vehicles) are usually provided with some form of manifold to facilitate hooking in lines from several sources. Control valves may or may not be included.

Ladder pipes

The ladder pipe developed from the discovery that firemen could get better penetration into the upper part of a structure by operating from a ladder. Initially it was necessary for the pipeman or nozzleman to wrestle with his pipe on the ladder, to his danger and possible discomfort. With the coming of aerial ladders, a pipe holder was devised which could be permanently mounted on the end of the main section of the aerial. So affixed, the nozzle could be manipulated from the ground by means of guide lines. The next development was to lighten this nozzle assembly and make it removable and portable.

The introduction of the all-metal aerial ladder saw still more refinement and improvement in major ladder stream devices. It is still possible to control these nozzles from the ground by means of hand lines, but nearly all of the modern types have a hand lever for manual control by a fireman stationed on the ladder.

All of the newer models are of the portable type and may be attached to the ladder at any point indicated by the officer in charge. Many fire departments make use of two ladder pipes on a single ladder, positioning one at the tip of the fly and the other at an intermediary point. In New York, Rochester and some other cities, the intermediary ladder is permanently fixed, the nozzle being supplied through a permanent light weight metal pipe, or a combination of pipe and large hose. All that is necessary is to connect supply lines to the permanent siamese at the base of the ladder.

The most recent innovation in ladder master stream devices is the application of power, electrical and hydraulic, to operate both nozzle direction and pattern of stream as described later.

The most progressive accomplishment of the last half-century in the field of fire stream control appliances is considered by some authorities to be the application of power to remote control of these master stream devices.

Although the millenium has not been reached, and there still remains further development to broaden the field of application, powered master stream deluge guns, turrets and ladder pipes have emerged from the experimental stage and are in practical operation on the fire front.

Both electrical and hydraulic power are employed in the several devices with advantages which should be readily apparent to the professional fire fighter. Thus far, the electrical application has been limited to ladder pipes and nozzles. Hydraulic applications include both fixed and portably heavy duty or master stream appliances.

Hydraulic-powered devices

The first revolutionary power-operated master stream device having remote control was manufactured by Chiksan Company, Brea, Cal., and installed on the Philadelphia Fire Department's SS-99 Giant Deluge apparatus, after exhaustive tests by that department. Since that time it has operated at several major fires with excellent results.

The story of Philadelphia's SS-99 Giant Deluge and this unique nozzle was told in detail in FIRE ENGINEERING of December 1955. Briefly, the latest model of this giant deluge gun has an effective striking range of better than 320 feet and elevated to 75 degrees, its stream will reach a height of 165 feet. At 30 per cent elevation, the nozzle will delivery 2,500 gpm an over-all distance of 425 feet.

One-man operation

Notwithstanding this volume and reach, and the fact that pressures may vary from 30 to 300 psi, the hydraulic controls are positive and rapid, only one man being required to manipulate them. It is said that when used manually, one man can easily control the operation.

The deluge gun permanently mounted on Philadelphia's Giant Deluge is supplied by multiple intakes servicing either 2½ or 3½-inch hose. The water is fed through a gated valve into a 58½-inch horizontal supply pipe, 4 inches in diameter. This is the "gun." All pipe turns are gradual, there being no sharp turns or flanges to decrease friction loss. The length of this gun measured from the horizontal supply line to the extreme of the stacked tips, is 81 inches. These tips range from 1½ inches to 2½ inches. In the event the weapon is required for demolition purposes, the tip size can be decreased to gain velocity.

Modern "heavy artillery" of the fire service. Fire fighting Big Berthas and Little Berthas are helping hold the fire line—and fire losses. **Above:** New Haven's trailer-deluge mounted with two fixed monitors and the deluge fog unit mounted with two heavy turrets and one portable gun. **Below:** Battery of heavy stream units of the Philadelphia Fire Bureau. Included are the SS (Special Service) 100 and 99 Giant Deluge. In addition to fixed and portable conventional type monitors, the Giant Deluge mounts a remote controlled hydraulic gun and

the SS 100 carries the latest multi-use nozzle for fog-foam, solid foam stream, or solid water stream. **Above:** Memphis has added a number of heavy stream units such as this Salvage No. 2 mounting the latest master stream devices capable of discharging up to 3,000 gpm. **Below:** Latest Memphis Big Bertha is the Multi-master, which mounts the largest size turret, shown here delivering over 1,000 gpm of water fog. The unit also carries an assortment of specially designed fog applicators

The deluge gun itself is constructed with a helical barrel 4 inches in diameter, with a 270-degree loop, which is maintained in order to balance all vector forces. This loop eliminates the need for splitting and remarrying the stream. The entire gun is hydraulically operated through vertical and horizontal pistons, each controlled by a three-way valve. The main water supply is taken through a by-pass into the three-way valves which in turn, either load or relieve the cylinder pressures for the desired action. The motion of the device can be speeded or retarded by hand valves which feed the control levers. If desired, with slight modification, the control levers can be made portable, permitting the operator to operate the gun by remote control from a safe area.

Controls operate the nozzle pattern as well as direction, range, etc., of the stream. Any standard nozzle can be used from smaller sizes up to 3-inch, singly or in stacked tips. For heavy-duty fog applications there are large-volume fog heads available which will produce 2,500 gpm of finely divided fog or semi-solid stream at 150 psi. With pressures increased to 300 psi, it has been demonstrated the appliance will perform efficiently with no increase in manpower required.

It should be mentioned also, that the SS-99 Giant Deluge is equipped with a battery of conventional portable deluge guns which can be operated from their positions on the apparatus or removed for portable service.

This type of remote-controlled master stream appliance fulfills a need for a unit that would permit either a heavy-duty fog, or powerful solid or semi-solid stream to be operated within range of a fire or possible explosion, that would prohibit manual operation.

Vogt hydraulic ladder pipe

FIRE ENGINEERING in its issue of September 1956, told about the tests conducted on heavy stream appliances at the Rochester Fire Training Academy, under the direction of Deputy Chief Louis Vogt, superintendent of maintenance of the Rochester Fire Bureau, and chairman of the sub-committee of the NFPA-IAFC Committee on Fire Department Equipment.

The tests were designed to include losses in the devices at various flows using the tips and equipment furnished by leading manufacturers of hose stream devices including the Akron Brass Co.; American LaFrance Corp.; Samuel Eastman Co., Inc.; Elkhart Brass Mfg. Co.; and Wooster Brass Division, Fyr-Fyter Co. Assisting Chief Vogt and members of the Rochester Fire Bureau in the tests were the following committee personnel: John E. Barman, Missouri Inspection Bureau; Robert C. Byrus, University of Maryland; Boyd A. Hartley, National Board of Fire Underwriters; Hubert Walker, representing the Fire Apparatus Manufacturers Association; Roi B. Woolley, FIRE ENGINEERING, and Warren Y. Kimball, NFPA staff. Observers from the several manufacturers represented were on hand, together with a number of visiting fire officers.

The tests demonstrated, among other results, the need for a ladder pipe that could be controlled and operated mechanically, and remotely. Chief Vogt set about remedying this need. And this summer he demonstrated such a device to members of his sub-committee on master streams in Rochester, using a regulation fire department metal aerial ladder and pumper.

The pipe designed by Chief Vogt has a large waterway (3½-inch minimum throughout) with a ball joint which permits vertical directional control of the stream without any gooseneck or yoke restriction.

The assembly (exclusive of nozzle) is made of alamaz which is as light as aluminum and said to be stronger than brass or other non-ferrous metals.

Hydraulic controls operated from the ladder turntable enable the operator by means of a small box with two simple switches to control both elevation of stream and pattern from straight stream to full fog. A movement of one lever one way raises or lowers the pipe; the other lever governs the nozzle pattern.

The ladder pipe cannot be thrust over backward as has been known to happen with older rope-controlled nozzles. To meet the Underwriters' requirements, all operations can also be controlled manually.

The hydraulic controls have snap couplings at the pipe (and hydraulic lines are always filled for instant operation). The hydraulic system can also be operated by remote control.

An added feature is the fact that this is said to be the only master stream operation that can be quickly set up and placed in operation by one man. The pipe assembly, without nozzle, weighs less than some large capacity nozzles it operates, and considerably less than some conventional metal ladder assemblies.

According to some observers, this is the first time a ladder pipe has been built with full flow capabilities of a water tower of well over 1,000 gpm. The pipe itself can efficiently handle flows through a 2-inch tip with no appreciable loss.

Electrically controlled ladder pipe

The electrically operated ladder pipe was first shown at the conference of the International Association of Fire Chiefs in Omaha, Neb., in 1955 by Akron Brass Mfg. Co. It is said to be one of the first devices to make available push-button operation to the fire service.

A control panel is mounted on the aerial turntable pedestal within reach of the fireman operating the ladder. A heavy-duty cable connects the panel to the ladder pipe assembly on which is mounted two weatherproof motors; one controls the elevation of the nozzle through a worm and gear drive and the other varies the setting of the 500-gpm fog nozzle with which the ladder pipe is equipped.

By means of the push buttons, the operator can easily and quickly control the stream elevation and the shape of the nozzle pattern from 90-degree fog to straight stream.

Heavy-duty water fog

A phase of master stream defense which has had only spotty consideration

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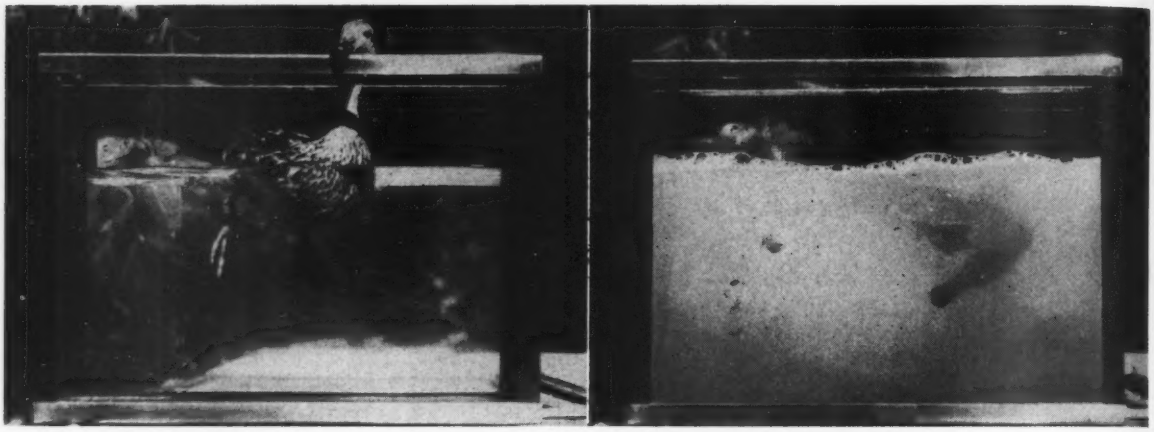

The Miami Fire Department, assisted by a pintail duck, demonstrates the penetrating powers of wet water. Left: a chemical detergent has been added to the water in the glass tank and the duck starts to sink, robbed of his buoyancy. Bewildered, he keeps his head up but he can't swim, as the treated water soaks his feathers. Right: The almost-dead duck drops to the bottom of the tank weighted down by his sodden feathers. The penetrating chemical has clouded the water, giving it the misty look. The duck was rescued from the tank before drowning

Another in the Series of Chemical Studies

Theory and Application of Wet Water

By PAUL F. DeGAETA* and ARNOLD A. WEINTRAUB**

DURING THE PAST DECADE the fire service has come to know of a group of substances called "water wetters" or "wetting agents." In the beginning, the fire fighter looked askance at the idea that water, his most potent tool in the fight against fire, could be made "wetter." After all, he reasoned, isn't water wet? But does water really wet in all cases and in all degrees?

An endless number of cases can be cited to prove that water will not wet all materials. We see that water will roll off a dusty or oily surface without any apparent wetting. All about us in our work and in our everyday existence are examples to remind us that water wets some materials very poorly indeed. A very familiar example in nature is the duck, and other water fowl, which are able to float on water though they are actually heavier than water. They can do this because they exude an oil which coats their feathers and skin, preventing water from wetting them. The massed feathers and entrapped air then make a bulky body that displaces a volume of water weighing more than it does. As a result the body floats.

Several years ago a manufacturer who wished to demonstrate the ability of his product to make water wetter, exhibited a bowl of water on the surface of which floated a duck. By adding a small amount of his chemical the conditions were so altered in the bowl, that the duck suddenly and unceremoniously sank to the bottom.

What has just been said of the duck may seem to have no bearing on our subject, but it is a fact that some of the basic reasons that make it possible for a duck to float on water also make it possible for some burning materials to resist the onslaught of thousands of gallons of water.

Before considering these cases where water is an inefficient extinguishing agent, we shall turn our attention to a study of the principles which govern some actions of liquids in general and water in particular. In this connection, the writers wish to reiterate their basic premise: Familiar phenomena can best be explained by a serious study of science and the laws of nature.

By learning some of these fundamental truths we may use this knowledge in explaining why and how water can be used in ways heretofore believed to be impossible.

Electrical nature of matter

The familiar properties with which matter is identified can be attributed to the fundamental particles of which all matter is composed. Basically, matter is electrical in nature. The atoms are made up of nucleus, positive in nature, surrounded by electrons, negative in nature, in a configuration which results in an over-all neutral unit.

In a chemical reaction, by an exchange or sharing of outer electrons, atoms are able to upset this neutrality, so that one atom is then negative and another positive. In accordance with the general law of electricity that unlike charges attract, the oppositely charged atoms are attracted to each other and held in tight bond.

The resulting combination, called a molecule, is a structure which is neutral. As we shall see later, however, there are special cases in which the molecule may act as though it carried electrical charges.

An idea of the magnitude of the interatomic electrical forces can be gained by considering that a quart of ordinary salt (sodium chloride) solution in water releases charged atoms which carry an electrical potential of almost one billion times the greatest voltage produced by man! Of course the solution has no charge because it has the same number of positively charged sodium atoms and negatively charged chlorine atoms.

States of matter

Matter can exist in any one of three states: Gas, liquid or solid. The difference in each state is due to the degree of free-

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***Lieutenant, New York Fire Department, and instructor in chemistry, Queens College, N. Y.*

dom of the constituent molecules. The degree of freedom, in turn, depends upon internal forces which cause the molecules to be attracted to each other, and the kinetic energy which causes the molecules to move about. The attractive forces act only through short distances, and are called "short-range forces." Each molecule exerts a definite attractive force for a short distance in all directions, in what we shall call the "sphere of influence" or the "field of force." In addition to these forces, there are also repulsive forces which act to keep atoms and molecules apart when they approach within certain distances, and their electron orbits begin to interpenetrate. When this happens, the like charged electrons repel each other and the atoms or molecules are pushed apart. The repulsive forces are responsible for making liquids and solids resist compression.

In the gaseous state, the molecules are so far apart that they do not exert any appreciable force on each other. They move about in comparative freedom and collide and bounce off each other without loss of energy. As a result, a gas has no definite shape nor volume. It has only mass. Gases offer little resistance to external forces and are easily deformed and compressed.

A molecule which is the same distance from all other molecules has all its energy in the kinetic form. As it approaches one or more molecules at closer distances than the others, it experiences changes in the external forces acting on it. This causes part of its energy to be changed to potential energy while the rest remains kinetic.

As kinetic energy diminishes (heat energy is lost), the gas molecules move about at slower speeds and through shorter distances. As they approach other molecules, there is less of a tendency to bounce off each other and fly out of the range of attractive forces. The molecules then begin to collect together in a loose yet definite grouping. This transition from the gaseous state is called "condensation" and the new form is called the liquid state.

Liquids are characterized by definite mass and volume. The molecules vibrate about fixed points and occasionally a molecule will move over into another position. In this way they are able to move about and slide over each other, constantly changing places, while still attracting each other to a certain extent. This causes the liquid to have no definite shape of its own, but takes the shape of the containing vessel. Liquids flow easily, but resist compression to some degree.

As more energy is lost, the molecules cease moving about and are attracted to each other in a closer relationship. The molecules are then held in a kind of rigid pattern, where their motion now consists of vibrations about a fixed point. This transition is called "solidification," and the new form is called the solid state. Solids have definite mass, shape and volume. They resist deformation from external forces.

Because gases can expand and fill any container, there is no clear-cut, free boundary by which to describe them. As a result, we speak of gases as consisting entirely of surface. Liquids, on the other hand, present a definite line of separation from the other states. This we call the surface of the liquid, and each liquid has only one free surface. Solids, however, possess three dimensions: length, width and height, and therefore, more surfaces. It must be pointed out, however, that in certain geometric shapes, such as the sphere, solids have only one surface. In the cone shape, solids have two surfaces, and in the cube, they have six surfaces.

Liquids and solids, then, have surfaces and an inner body itself. It has been estimated that in some compact crystals only one molecule in six million lies in the surface, while in some very porous substances as much as one quarter to one half of the active particles are in the surface. These facts, and those concerning the fields of force are most important to our present subject.

Mass, inertia, weight and work

In order to develop an understanding of the concepts to be introduced, it is well to pause at this point to define and explain some fundamental physical terms.

We spoke of matter as existing in three states or phases, gas, liquid or solid. Any attempt to define matter will fall short, for it is so fundamental as to defy description. However, we do know of matter through its properties, two of which are its ability to occupy space and its inertia, that property by which it will remain in motion or at rest unless acted upon by some outside force. Inertia is illustrated when a fire truck starts up suddenly and the riders are thrown backward; or when the truck stops abruptly and the riders fall forward.

All matter possesses this property of inertia and it is due to the mass of the body. Mass may be defined as the amount of matter it contains which gives it the property of inertia. Mass, then, is a measure of the inertia of a body.

The mass of a body is constant and invariable, no matter where on the earth the body is taken. This is not so with weight, which is very different from mass. Weight is a measure of the pull of gravity on a mass of matter measured at sea level at 45 degrees latitude. In other words, a mass of matter which weighs one pound under these conditions, will weigh more than a pound at the North Pole; less at the top of a high mountain. While mass remains always the same, weight varies as the distance from the center of the earth varies.

This pull of the earth on a body is called the force of gravitation. The word force may be defined as any pull or push exerted on a body which tends to change its motion or shape. We are familiar with many kinds of forces. Weight is a force, as is the pull of our muscles in lifting an object. So is the push of a pump piston on water in producing a fire stream.

What we have just said concerning mass, inertia and force leads us to consideration of another important concept of mechanics, that is, work. Work in the physical sense is different from that in common speech. For our purpose, work may be defined as the change brought about when a force acts through distance, or the product of distance and force. We do work when we lift an extinguisher or drag hose over the ground because we exert a force for a definite distance. We do no work when we exert force against a heavy pumper or wall which does not move, no matter how hard we try.

Energy, temperature, heat

Closely associated with matter is energy, and like matter it too is so fundamental as to defy description. We say,

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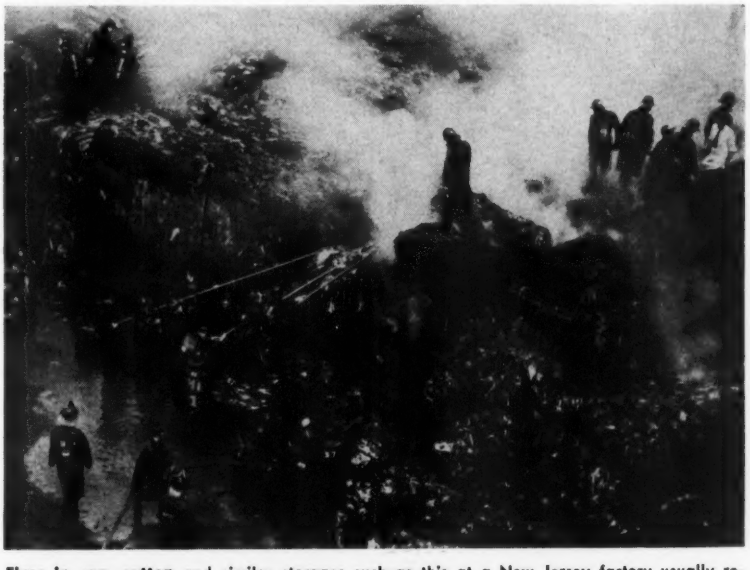

Fires in rag, cotton and similar storages such as this at a New Jersey factory usually require lengthy, laborious overhauling before all threat of rekindle is removed. Wet water is ideal for this type of operation when properly applied

Traffic signals are coordinated by radio from a central point in Evansville, Ind. Fire apparatus follows previously set routes or "fire lanes" which are indicated by flashing yellow lights. Cross traffic is stopped by flashing red signals —*General Electric photo*

Better Traffic Control Continues to Be the Fire Service's No. 1 Response Problem

Electronic control systems, now in practical operation, offer greatest hope of solution . . . closed-circuit TV in the offing

By **DONALD M. O'BRIEN**

Electronic vehicle traffic control is operated by switch located on dash of apparatus which activates traffic lights ahead of emergency vehicle—*Electronic Protection Inc. photo*

REGARDLESS OF OTHER PROBLEMS included in both short and long-range plans and programs for fighting fire, one big question continues to obtrude itself. That is the matter of response to emergency calls by the fire forces under traffic controls and congestion conditions currently encountered in most of our crowded cities and communities.

Nearly ten years ago, the National Board of Fire Underwriters said in its Special Interest Bulletin No. 273, "Observation and analysis of traffic conditions in the course of regular surveys of cities by the NBFU engineers have disclosed that little or no consideration has been given by municipal authorities to its relation to an important city function—that of fighting fires." And the Board added, "No municipal traffic plan or ordinance is complete or workable unless it gives full consideration to local fire department response."

That was in 1948. Today the same statement could safely be made. In fact, in many ways conditions have worsened. The only encouraging signs in the otherwise gloomy traffic picture are the successful efforts of a limited number of manufacturers of traffic control devices who have introduced products—mostly electronic—which permit responding fire fighters to exercise some positive control over the traffic signals along routes they must travel.

Response endangered

Meanwhile, as every metropolitan chief at least knows, apparatus response on the average is being slowed with resultant ill effect upon the efficiency of fire control and extinguishment and worse still, with increasing hazard to the lives of those within areas which the firemen must protect. The evidence is found not only in the daily fire reports, but in the mounting number of accidents to fire apparatus, and injury to their crews (not to speak of injuries to citizens).

Local fire department response is customarily based upon some sort of running card (one big city chief facetiously refers to it as a "walking card"). This response assignment is usually prepared by the local fire chief and his communications staff with due regard for local existing traffic conditions. Obviously fire fighters must take the most direct, shortest route to the scene of an emergency. But equally plain is the fact that a one-way street is not necessarily the shortest distance between fire station and location of the fire or emergency.

In many cities struggling with the traffic problem, traffic flow is being switched around on streets and avenues—sometimes not once but several times in the course of a year or two. Every switch means possible further complications and delays in setting up comprehensive fire force response plans and schedules. It means delayed response of fire forces and attendant increase in working and multiple alarm fires—may mean more casualties, more fire losses and increased fire department costs to the city (one city lawsuit growing out of a traffic accident cost a city $50,000—which would have bought several good pieces of fire apparatus at that time).

Visible on electronic traffic signal control stanchion is a small antenna for receiving impulses from vehicle and emergency warning indicator light. Radio receivers and flash control mechanism are contained in controller housing (left)
—*Connecticut Daily Campus photo by Don Trail*

In a day when fire defenses are being tailored to fit the expanding needs of most of our metropolitan areas, it is all the more important that traffic engineers and city officials give serious thought to the use of thoroughfares to facilitate fire department response before they decide upon drastic directional or other changes. Certainly the long-range traffic problem should include consideration of such details as possible location and relocation of fire stations; routes that must be taken by fire forces in responding particularly during rush periods, and possible routes to be followed by vehicles carrying highly flammable or explosive materials.

Going further, traffic plans and programs must take into consideration the effect of parking and its impact not only upon response, but upon rescue and fire fighting operations. A few cities have had the courage to prohibit parking around all places of public assembly such as hotels, auditoriums, theatres, etc., and where it was impossible to prohibit parking in all streets in the congested areas, to prohibit parking on certain streets that must be traveled by responding fire apparatus. Such streets are kept open as fire routes, or lanes, and are plainly posted. The establishment of such lanes has proved helpful in some cities—but there still remains the problem of the cross streets and of eliminating pile-up of traffic on those thoroughfares to permit free passage of fire units.

New York has "yellow lane"

Going further, the City of New York has been experimenting with what is called the "yellow lane." This is a center strip, marked off on one-way avenues by yellow dotted lines which indicate the lane is reserved for responding fire apparatus. Upon hearing warning signals of apparatus, auto drivers are expected to drive to right or left, opening the lane to the firemen.

According to some fire officers who have studied the matter, with this lane and its purpose properly sold to the motorists and others, it may be possible for fire apparatus to travel in the yellow lane against traffic with reasonable speed and safety.

The methods employed by the fire service to meet the existing traffic challenge vary according to the community. In some cities the accident problem has become so serious that department regulations require responding apparatus to obey all traffic signals, including stop signs at intersections. "This may result in some delay," explained a municipal fire commissioner, "but it is better to have delay than to have an accident and perhaps never get there—or to injure somebody."

The answer is proper control

Most communities have resorted to some method of control over the street corner traffic signals as a logical solution. This has resulted in further research on the subject and several original systems for such control have resulted. Many of these were reported in the October 1956 issue of FIRE ENGINEERING (Electronic Traffic Control to Speed and Safeguard Fire Force Response).

Basically all methods depend on switching the individual corner traffic light to the indication desired. The variations that do exist relate to the actual control system that is necessary to accomplish this switching.

Taking first the wired systems presently most widely used, these essentially depend upon remote control by means of the existing cables which connect the individual signals to the master controller, usually located at a central point where the community's traffic bureau or police department has access to it. From this point a special circuit is taken to the fire department dispatching point where the operators on duty may manually change the signal indications depending on the response of the apparatus.

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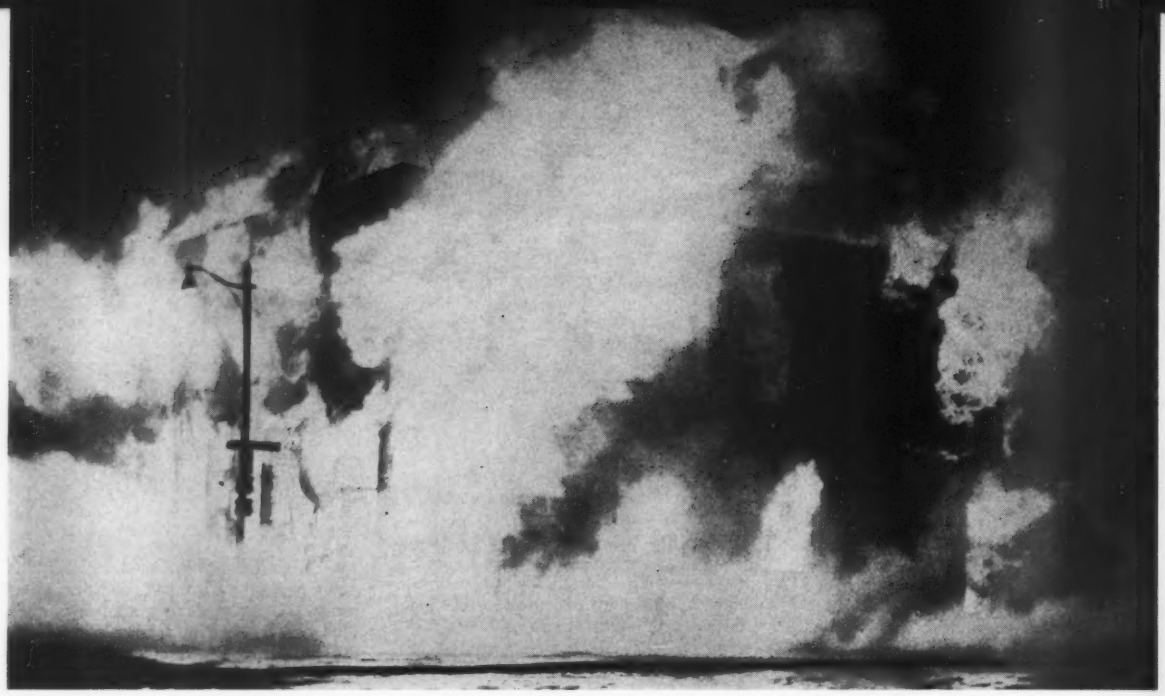
Los Angeles pumper traversing intersection protected by apparatus-controlled electronic signals which have been set by driver of responding apparatus—*Eagle Signal photo*



Wooden hotel proves pyre for eight. Fire originating at night in a Crookston, Minn., tavern's first-floor restroom destroyed the two-and-three-story frame structure in 30 minutes. Firemen, called half hour after fire was discovered, managed to rescue many of the 38 guests. Sprinklers would have prevented this tragedy

"The Burned Building Had No Sprinklers!"

All-too-familiar tag-line found in fire department and Underwriters' reports of large-loss fires should teach lesson

By T. SEDDON DUKE

MUCH HAS BEEN WRITTEN, over the years, of the early history of fixed piping systems for fire extinguishment. Naturally, this goes back before the days of the automatic sprinkler when perforated pipe with the water manually controlled represented the fire protection of the day. The modern-day automatic sprinkler is, of course, a vast improvement over the crude early attempt to control fire through perforated pipe. History is of particular value when it teaches us a lesson that is profitable. Today, through the vast facilities of the Underwriters' Laboratories and the Factory Mutual Laboratories, we know about the densities needed to control and extinguish fires in practically any type of material or occupancy. When you think of the record of automatic sprinkler protection over 50 years and look back, realizing that those early pioneers had to guess at the spacing of sprinklers and the water supplies required, I think you will agree that they did a most remarkable job. It is for this reason that we briefly summarize the history of sprinkler protection.

There was a report made by a committee on automatic sprinkler protection and adopted by a conference held in New York City on March 18, 1896. The committee and sub-committees were composed of the representatives of the insurance organizations with one notable exception—that was Mr. Frederick Grinnell, the founder and guiding spirit of the Grinnell Company. Since that meeting 61 years ago, close cooperation has existed between the sprinkler industry, the National Board of Fire Underwriters, the Factory Mutual Laboratories, the Underwriters' Laboratories and all of the great insurance carriers. In 1914, the automatic sprinkler industry, to bring the best minds and talents available within it to solve their common problems, formed the National Automatic Sprinkler and Fire Control Association. For well over 40 years this association has not only worked closely with the insurance associations, but with their memberships on the various committees of the National Fire Protection Association, have aided in setting up standards which have been of inestimable value in the great cause of fire prevention and fire protection.

Sixty-one years have not changed the fact that the problems facing the science of fire protection, with particular reference to automatic sprinkler protection, are the same today as they were even before the turn of the century. The committee, meeting on that early spring day in 1896, relied on experience and tabulated facts gleaned from fires which occurred within the 10 to 12 years preceding that first meeting. To illustrate the similarity of today's problems with the problems of yesteryear, we will quote from the records of that committee which had based its

findings on information available to them covering a period of time from 1884 until 1896:

"Of the 56 fires, in which an unreported number of sprinklers operated, 33 are reported as being properly controlled by sprinklers; 19 resulted in severe loss owing to one of the following causes: (1) Fire originating in exposures; (2) fire originated in unsprinklered room; (3) no water for sprinklers, owing to closed control valves; (4) tank supply exhausted; (5) hollow walls or ceilings through which fire spread unimpeded."

In six decades that followed this meeting in New York City, $100 billion worth of American property and millions of lives have fallen under the protection of auto-

Continued on page 888

Action shot of sprinkler system discharging in a laboratory, a type of occupancy where the fire and explosion hazard may be severe *—Photo courtesy National Automatic Sprinkler and Fire Control Association*

Any review of the progress made in the field of fire control and extinguishment during the last 80 years must, of necessity, encompass the story of the sprinkler and of automatic sprinkler fire protection.

Its vital part in safeguarding the nation against deadly, destructive fire, in preserving the lives of our citizens—yes, and our fire fighters too—is only partly told in the cold statistics of hot fires in all kinds of occupancies, where people live, work and otherwise congregate.

The record is written into the daily journals of municipal fire departments throughout the country—and the loss totals of fire organizations.

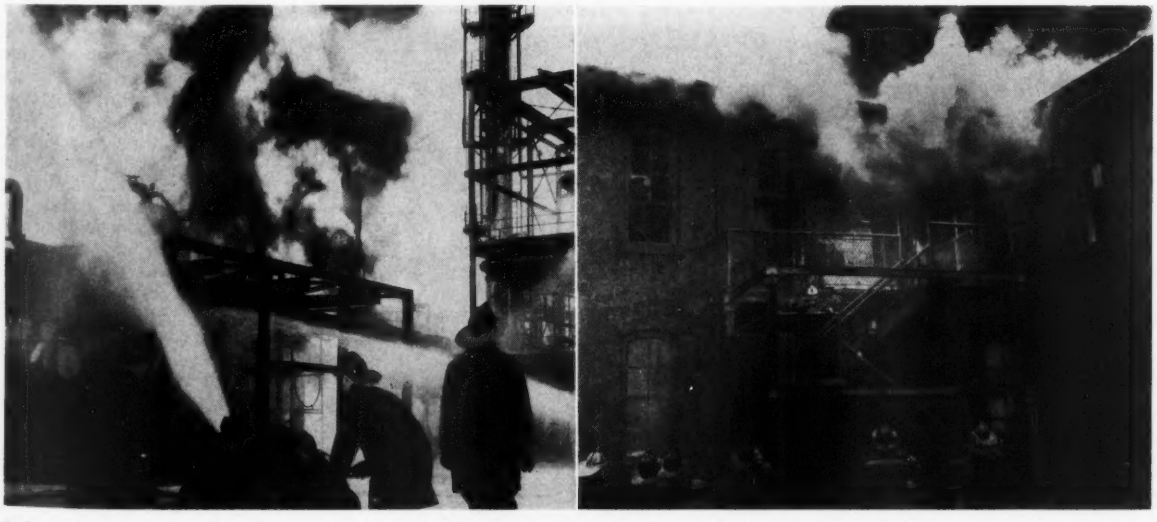
Notwithstanding its real and potential protective qualities, and all that this means to fire fighters, it has been said that the fire service has been lethargic in actively promoting installation of sprinkler systems, as well as automatic fire detection and alarm notification. This may be true in some unenlightened areas, but we have yet to meet a forethoughtful fire officer who is not conscious of the value of sprinkler protection and who did not personally advocate modern automatic fire control. Particularly since the beginning of the trek of people and industry into the hinterlands and suburban areas, with resultant demands upon inadequately equipped and staffed fire fighting forces, many progressive fire officers have come to look upon the sprinkler as their main reliance in coping with fires involving these areas.

True, there have been mistakes in planning, installing and maintaining sprinkler protection. There have been costly errors in operating sprinklers and sprinkler systems in time of fire. But most of these errors were human failures. In short, the sprinkler system is no better than those who must operate it. And it is possible that the fire service is more accustomed to hearing about sprinkler errors than about accomplishments.

Control and extinguishment of fires by automatic sprinklers in this day and age is becoming so commonplace that it is no wonder fire fighters are inclined to accept the modern sprinkler protection just as they do their latest acquisitions in fire fighting equipment. This is all well and good—but such complacency will not help bring about installations of more sprinkler systems, particularly in those hazardous occupancies not now so protected.

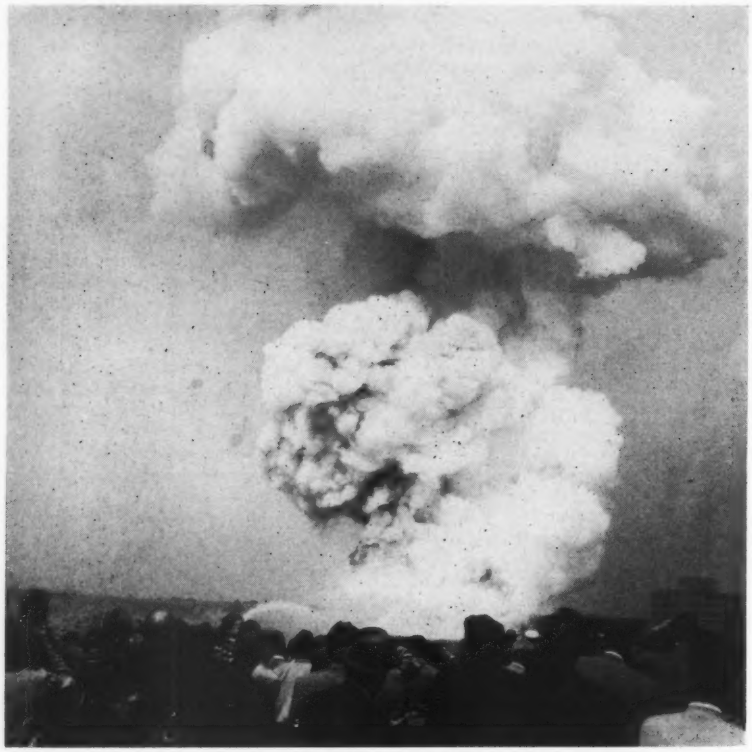
The editors of FIRE ENGINEERING would like to see a crusade on "piped protection," i.e., modern automatic sprinkler protection, similar to the effective one presently being waged on loss of life by fire, particularly in the children's category.

To help kindle greater interest in this essential medium of fire safety, the editors asked Mr. Seddon Duke, president of the Star Sprinkler Corporation and past president of both the National Fire Protection Association and the National Automatic Sprinkler and Fire Control Association, to prepare the paper which follows. Mr. Duke has not attempted to trace the interesting history of the discovery and development of what we call sprinkler protection, nor has he attempted to describe and picture all of the mechanical improvements that have taken place in sprinklers, i.e., the different type heads for different purposes; the ability to discharge not only water, but treated water and chemicals, water in the form of fine fog or coarse spray, foam and even dry chemical. All that is another story. What he has done is to condense for our readers the more fundamental aspects of the basically essential modern fire control and extinguishing systems.



Left: Ruptured propane and butane lines in still at Gulf Refining Co., Philadelphia, fed hot three-alarm fire that kept firemen at distance. Where the type of occupancy might be unsuited for one type of sprinkler, it may be well served by another appropriate type. **Right:** This old Philadelphia stone school building was taken over by the Quaker School of Aeronautics in 1946. In 1955, fire of undetermined origin, starting in the unsprinklered loft area, caused heavy damage before fire fighters responding to four alarms could control it

—Philadelphia F. D. photos by Lt. Robert Kennedy



Not an atomic bomb but the explosion of less than half a ton of burning magnesium shavings when hit by a solid stream of water at the New Haven Fire Department Training Grounds. Radiated heat was felt over 500 feet away

Increasing Use of Hazardous Metals Poses New Extinguishing Problems

Titanium, zirconium, magnesium form tough trio for fire fighters—others are in the offing

By ROI B. WOOLLEY*

ALTHOUGH THE FIRE EXPLOSION possibilities inherent in certain metals and metallic powders have been known for many years, it remained for World War II, and the wholesale use of magnesium incendiaries to focus attention of the nation's fire forces on this metal as a potentially destructive entity.** The rise in the use of magnesium, spurred in large measure by our expanding industrial economy, and the introduction of other new light metals, have resulted in vast scientific study not only of the characteristics of these metals under fire conditions, but of the most efficient and safest methods of storing, working and handling them to prevent disaster.

Some years ago, what is known as the Committee on Hazardous Metals was formed by the National Fire Protection Association, with Hylton R. Brown, Bureau of Mines, U. S. Department of the Interior, chairman, and given the task "to obtain and correlate information on fire hazards; methods of storage, handling and use; the fire protection of magnesium and other combustible metals, and to develop standards for safe storage, handling and manufacture." Another and still earlier group of the NFPA known as the Committee on Dust Explosion Hazards was responsible for measures for the prevention or control of metal dust explosions. The recommended standards for the storage, handling and processing of magnesium have been revised yearly and published by the National Board of Fire Underwriters as "NBFU Pamphlet No. 48." Proposed standards for fire and explosion prevention and protection of titanium were approved at the recent meeting of the NFPA in Los Angeles. Both will be included in the NFPA's revised National Fire Codes.

Meanwhile, material progress has been made in the development of various extinguishing agents and methods of their application to magnesium and other less known and used metals, by manufacturer groups such as the Magnesium Association, individual chemical and fire extinguisher manufacturers, insurance and underwriters interests, and various government agencies.

Magnesium—the many sided

Magnesium, either as pure metal or alloy, is finding ever-widening application in industry, and in common household products such as appliances, furniture, office equipment, and in various building construction. A late development is in the field of commercial and fire ladders. Nowadays magnesium in one form or another may be encountered by the fire department of any average industrial city during its inspection of, or in fighting a fire in, a manufacturing plant. It has been described as the lightest known structural metal possessing properties of permanence and stability.

Magnesium is a silvery white metal with an atomic weight of 24.32 and a specific gravity of 1.74; its melting point is 1,202 degrees F. and the ignition temperature is generally considered to be very close to the melting point, but ignitions in certain form may occur at air temperatures below the temperature given as the melting point.

The ease of ignition depends to a large extent on the size, shape and form of the material as well as the degree and the intensity of the ignition source. When the rate of heating is rapid, magnesium melts before it burns, creating what may be a severe explosion hazard if the molten metal is allowed to come into contact with moisture.

Most commonly encountered in manufacturing plants are magnesium ribbon and chips or fine shavings. These can readily be ignited at temperatures around

* Member NFPA Committee on Hazardous Metals.

** As far back as 1918, Dr. Von Schwartz ("Fire and Explosion Risks," published by Charles Griffin & Co. Ltd., London) wrote, "In daily life the term 'metallic' or 'of metal' is regarded as synonymous with incombustibility; but though this is true of some metals and under certain conditions, in a far greater number of instances, metals prove combustible and even flammable, liable to spontaneous ignition, the cause of dangerous explosions, and quite unreliable in fire, even when in compact masses."

950 degrees F. Very finely divided magnesium powder can be ignited at temperatures below 900 degrees. Heavier pieces, such as castings or ingots, are difficult to ignite because heat is conducted rapidly away from the source of ignition. If the entire piece of metal can be raised to the ignition temperature (about 1,200 degrees F. for pure magnesium and many of the alloys) self-sustained burning will occur.

As emphasized in Pamphlet 48, "the combustibility of magnesium, the ineffectiveness of ordinary types of extinguishing agents on magnesium fires, and the fact that under certain conditions the application of these agents intensifies the burning and may release hydrogen to form an explosive gas-air mixture, all combine to create serious fire and explosion hazards."

The majority of magnesium fires occur in manufacturing plants and are handled by machine shop operators or factory fire brigade members. Usually they involve chips and other fine particles from sawing, drilling and turning operations. Even under ideal conditions, they call for alert, trained attack, utilizing the most approved extinguishing methods and material. Every plant employing magnesium in whatever form should be prepared for such emergencies. Provision also should be made for coping with fires in storage of bulk magnesium and/or processed products.

Obviously, plans for plant protection against such risks should include the closest kind of cooperation between plant management and the nearest municipal fire forces.

Chip magnesium fires

Chip fires can best be fought by smothering with a layer of a suitable extinguishing powder. Some of the powders act through smothering, while others tend to remove heat from the fire to prevent re-ignition.

The most commonly used powder is a graphite-base material containing additives. This type is represented by G-1 powder (Pyrene C-O-Two); Metal Fyr-Powder (Fyr Fyter Corp.); and M-1 Powder (Buffalo Fire Appliance Corp.). These agents are usually applied by means of a scoop, or if necessary, by shovel. The powders do not take up moisture from the air and therefore can be kept in cans, drums or tubes with loose fitting covers.

Although these powders are primarily intended for control of incipient shop fires, they will handle larger scrap fires, etc., if available in sufficient quantities. To meet more serious situations, appliances have been developed which discharge the powder through a hose at 75 to 100 pounds per minute.

Another type of powder used on magnesium fires in shops is Met-L-X (Ansul Chemical Co.). It consists primarily of a sodium chloride base material specially compounded with additives to produce water-repellency and free-flowing properties. It also contains components which cause it to adhere to vertical surfaces and form a hard cake when exposed to the high temperature of a metal fire.

This powder can be applied by means of a scoop, but it is usually contained in extinguishers and expelled by means of a carbon dioxide charge. The latest type extinguishers are similar to the dry chemical type. It is also available in piped systems for protecting liquid metals in large volumes.

Magnesium foundry fires: Salt-base fluxes are used in magnesium foundries to protect the surface of the molten metal from the air, preventing oxidation. These fluxes are also used to control fires in the foundry area due to spills, leaking molds, etc. The flux should not be used around machine tools because it picks up moisture from the air and causes steel equipment to corrode.

Fires in heat treating furnaces are now controlled through the use of boron trifluoride gas. If a powder is used, burning metal should be removed from the furnace where possible before application of the powder. Experience indicates that boron trifluoride gas is an effective extinguishing agent on fires in furnaces in concentrations as low as 0.04 per cent. Cylinders containing this agent may be permanently connected to entry ports of the furnace or may be mounted on a mobile cart or wagon for movement to the desired area.

When fire in a heating furnace must be extinguished, power and fuel and sulphur dioxide feed lines should be shut off immediately and the gas applied through the entry port at a rate of about two pounds per minute.

Furnace circulating fans should be operated for about a minute while the gas is flowing into the furnace to insure good distribution of the gas. The extinguishing agent should be applied until the temperature drops to about 700 degrees F. indicating that the fire has been extinguished.

Boron trifluoride gives good warning properties in the air through the presence of a white cloud. It is said that, contrary to some beliefs, hydrofluoric acid is not a breakdown product. Normally low concentrations may be experienced in the vicinity of the heat treating furnace; nevertheless the operator should wear a gas mask of the acid or all-service type to avoid the slight irritating effect of the vapors.

Boron trichloride gas (BCl_3) previously used to knock down magnesium fires in heat treating furnaces, has irritating fumes considered a health hazard similar to hydrochloric acid fumes. It requires about 10 times the gas concentration as that of boron trifluoride. Suitable safety masks should be available and ventilation provided when it is used. Water should not be used in fighting fires in these furnaces.

Use of water

Although the practice is not universally accepted, a number of authorities maintain that water can be used to control large magnesium fires (not chips or molten metal), provided that sufficient water is available, and if the conditions of the surrounding area (exposures) permit. It is said the Chicago Fire Department has for years considered water to be an effective extinguishing agent for magnesium fires in buildings, although the department recommends a much larger pumping capacity than other authorities believe is required.

Water applied as a coarse stream directed on the unburned metal cools it below the ignition temperature and tends to accelerate the existing fire to rapid burn-out. In a number of tests involving heavy magnesium castings, etc., (not fines), the fires could be controlled by directing streams upon the mass of material exposed to but not yet involved by the fire. However, where streams hit the burning magnesium, there was violent reaction. This occurred also, when water being used to cool down only a part of the storage (but not yet involved by fire) found its way to the burning mass. Where the burning magnesium is inside a building and of considerable area and

Los Angeles fire fighters employed many heavy hose streams to confine this threatening factory blaze involving 20,000 pounds of magnesium. Although men on lines were in range of flying magnesium, none was seriously injured. Fire was too hot to use corner hydrant

intensity, even if it were possible to approach it from the inside, many fire officers counsel fighting the fire entirely from the exterior, using heavy streams directed from safe areas. Under these circumstances, special attention is given to exposures. As long as there remains any burning magnesium within reach of water streams, violent thermal reaction should be anticipated.

All authorities apparently agree that water as an extinguishing agent should only be employed by well trained fire crews, and only after an appraisal of the situation (hazardous possibilities) indicates that it can be safely applied. Small streams or sprays from first aid extinguishers should in any case be avoided. The amount of water available is not sufficient to act as a coolant.

U. S. Navy uses TMB

A new liquid extinguishing agent that has been developed for the U. S. Navy is trimethoxyboroxine, or TMB. It is designed for fighting magnesium fires incidental to aircraft crashes.

The liquid is a component of the boron chemical family which oddly enough are being used to produce very high energy fuels for use in aircraft. TMB is also unusual in that it is a flammable liquid. It burns quietly with a small, light green flame and its flash point is approximately 55 degrees.

The viscosity of the TMB material increases very rapidly at low temperatures and it must be stored in temperatures above 32 degrees if it is to be ready for instant use.

TMB is used in 2½-gallon stored pressure-type extinguishers marked with an orange fluorescent band around the top. A shut-off valve controlling the liquid flow is contained in the handle at the top of the unit; a valve in the nozzle at the end of the hose controls only the pattern of the discharge. Normally this furnishes a straight stream with a maximum range of 25 feet; depressing the handle fully results in a spray pattern having a range of 15 feet.

Normally the ignition of magnesium parts in aircraft occur from a gasoline spill fire. After blanketing the gasoline, the burning magnesium may be approached if possible from upwind. When fire is within reach, the liquid stream is directed into the brilliant white flame.

The operator should keep in mind that TMB liquid catches fire quickly and therefore be prepared for the possible flare-up when it hits the hot metal fire. The extinguishing agent will seethe and froth, quickly taking on the look of a molten, glassy scum over the whole burning surface. By this action the magnesium mass, both solid and molten, is sealed off from oxygen in the air, preventing further combustion. A thick, glassy coating should be built up over all exposed, burning magnesium surfaces.

Zirconium unpredictable

In its pure form, zirconium is found as a massive metal with a silvery luster or lustrous, silvery crystalline scales. It is usually produced commercially as a dark gray powder.

Zirconium is used as a "getter" to remove hydrogen, nitrogen, oxygen, carbon monoxide and carbon dioxide from vacuum tubes during manufacture. It is also employed as an alloy in metals; in the manufacture of flashlight powders and flash bulbs; and as a detonator for explosive charges.

Metallic zirconium should not be confused with zirconium oxide, an inert oxide which is used as an abrasive or an insulator, or with the hydride, both of which are loosely called zirconium. The zirconium alloys used in the steel industry are also called zirconium. They are not a special hazard.

Reports indicate that zirconium production is expanding rapidly as demand increases and production facilities improve.

Some of the metal's physical properties are: Atomic number, 40; specific gravity, 6.4; ignition temperature, fine powder, 320 degrees F.; ignition temperature, fine powder, 986 degrees F. in nitrogen; ignition temperature, fine powder, 1040 degrees F. in carbon dioxide.

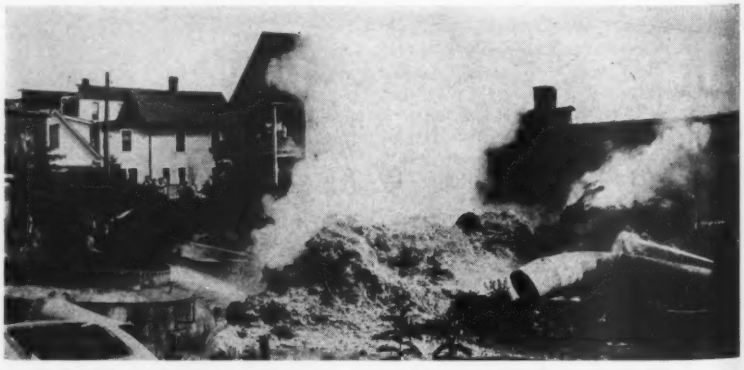
The metal is reported to be stable in air or under water at temperatures up to 125 degrees F. At high temperatures it has a great affinity for oxygen and combines rapidly and completely with nitrogen, phosphorus, sulfur, the halogens and other non-metals.

The major hazard is fire and explosion. The dry powder is ignitable at low temperatures by heat, static electricity, or simple friction. It is said to be more easily ignited than magnesium powder. It is reported that when dispersed into the air as a cloud, it explodes spontaneously, ignited by the static charges generated in the dispersal of the cloud.

Zirconium powder wet with water is safer to handle than dry powder because it is more difficult to ignite. Once ignited, however, the metal will burn violently, partly because the metal will decompose the water and use the oxygen for its own combustion and partly because the steam formed within the burning mass will scatter the metal. Powder containing about 5 to 10 per cent of water is stated to be the most dangerous.

Reports have been received of fires involving zirconium storage which suddenly "took off" without any apparent source of ignition. Two such fires recently resulted in several deaths.

Hot spot for fire fighters as magnesium erupts during a blaze that destroyed two hangars and four planes at McChord Air Force Base, Washington



Bridgeport, Conn. firemen fighting a junk yard fire were surprised and endangered by violent explosion in what turned out to be a large pile of magnesium covered aluminum shavings. Two-alarm complement using three 2½-inch fog nozzles finally controlled fire but not until houses were rocked and windows broken by blasts

Fire extinguishment

If zirconium is handled in small quantities and the individual units are properly isolated, some authorities believe it is best to let an ignited unit burn out quietly without interference.

Fire in a comparatively small amount of zirconium can be controlled by a large amount of foam applied very rapidly and in such a manner as not to disturb the powder. Such fires, it is said, can also be controlled by dry sand.

For the most part, the methods of extinguishment which have been found effective on magnesium fires should also be effective for small zirconium fires. Carbon tetrachloride, carbon dioxide and soda-acid extinguishers are ineffective.

Although a sprinkler system might be expected to intensify the fire rather than extinguish it, the spread of flames in quantities not exceeding 400 to 500 pounds of the product in one fire would be minimized by the wetting and consequent cooling of adjacent combustibles.

Storage exceeding 400 to 500 pounds should be given special consideration. It should be submerged in water or stored in fire-resistive cubicles containing units of not more than 400 or 500 pounds each.

Titanium the terrible?

Titanium is a silvery gray metal somewhat similar in appearance to carbon steel. It is as strong as the ordinary varieties of steel but only about 56 per cent as heavy. It is about one and a half times as heavy as aluminum, but is reported to be six times as strong as unalloyed aluminum. Its atomic weight is 47.90; specific gravity, 4.5, and melting point, 3,140 degrees F.

Titanium is classed as a combustible metal because of the fire hazard present during production of the raw sponge, melting of the sponge, casting, machining operations that produce fine turnings or chips, powder production and the handling and disposal of scrap.

Combustion can occur in atmospheres other than air. Fine powder test samples ignited in air as a cloud at 896 degrees F. and as a layer at 860 degrees F. The same samples could also be ignited as a layer in pure carbon dioxide at 1,256 degrees F. At red heat (1,300 degrees F.) titanium decomposes steam to free hydrogen and above 1,475 degrees F. it burns readily and vigorously in atmospheres of pure nitrogen.

Fire control

Effective fire prevention measures are imperative where titanium is present in readily combustible form. Fires in the powder can usually be controlled in the early stages by ringing the burning metal with rock dust or some of the inert dry powder fire extinguishing compounds and allowing the fire within the circle to burn itself out.

Not all authorities are in agreement on the possibility of extinguishing a titanium fire. Some state it is not possible to do so. Others call attention to the ineffectiveness of certain types of extinguishing agents.

One thing should be agreed upon: Water should not be used. Violent reactions have been reported in almost all cases where water was applied to hot or burning metal, although the Factory Insurance Association reports extinguishment of fires in small piles (10 inches by 2½ inches triangular cross section) of crushed titanium sponge and titanium turnings with a coarse water spray.

Carbon dioxide extinguishers are not effective because finely divided titanium will burn in carbon dioxide. In some experiments, it seemed to stimulate the fire.

Foam is not effective on titanium fires because of the large amount of water in the charge. In some cases foam can be used to form a protective blanket on combustible material surrounding the fire. Carbon tetrachloride also has not proved effective on any of the test fires report.

Inert gases such as argon or helium will extinguish titanium fires if they can be applied under conditions which will exclude virtually all the air.

Some authorities venture the belief that dry sand, graphite and certain dry powdered chemicals recommended for magnesium fires may effectively be used. Although actual evidence on the effectiveness of such agents is limited, their use is suggested, pending further experimental development as the best methods known for the control or extinguishment of small titanium fires. □□

The background material used in the preparation of this article has been taken from information supplied by the National Board of Fire Underwriters; National Fire Protection Association; Dow Chemical Company; Bureau of Mines, U. S. Department of Interior; Bureau of Aeronautics, U. S. Navy.

Pacific Coast Chiefs 62nd Annual Conference

THE FINEST CONFERENCE ever held in the association's 66-year history—that sums up the sentiments of over 500 members of the Pacific Coast Inter-Mountain Association of Fire Chiefs who assembled in Portland, Oregon, on July 16 through 19, for their 62nd Annual Conference.

The conference business sessions opened on Wednesday morning, July 17, in the auditorium of the central fire station. Mayor Terry D. Schrunk, formerly a lieutenant in the Portland Fire Department, officially greeted the association.

Chief J. T. Caldwell, Ellensburg, Wash., president of the association, called for a research fund and a permanent research committee to be headed by a professional engineer. He said economies and politics are pushing the fire service into a corner and fire chiefs must take immediate action for survival.

Among the other speakers were Miles Woodworth, National Fire Protection Association, a former fire marshal of Portland, who reviewed new methods of fighting oil tank fires; and Chief Kieth E. Klinger, Los Angeles County, who detailed his experiences as the officer-in-charge in combatting the Malibu fires last December. Chief Klinger told how the fire was fought through a chain of command similar to that used by the armed forces in battle. As the officer-in-charge he kept in touch with his divisional and sector chiefs by radio and praised the cooperation between firemen of the county, city and federal fire fighters on the fire line. Chief Klinger reported his greatest difficulty was keeping in touch with assisting units which operated on different radio frequencies. He said this will be overcome by the use of special communications trucks which the State of California will soon furnish counties.

On Wednesday afternoon, the Portland Fire Department demonstrated its three fireboats and other equipment for the visitors. The boats steamed up the river in line as they discharged over 24,000 gpm. Later one of the boats supplied two aerial ladder pipes and deck pipes of four engines lined up along the waterfront of the Willamette river.

On Wednesday evening, Chief Ivan Pearson transported over 750 guests to McMinnville, his home city 45 miles away, for a barbecued crab dinner in honor of retired Portland Chief Edward Grenfell.

The annual banquet was held Thursday, July 18, in the grand ballroom of the Multnomah Hotel with over 450 persons in attendance. Association secretary-treasurer, Jay W. Stevens, who is also IAFC executive secretary, was the guest of honor. Frank Branch Riley was the principal speaker. Chief Stevens was the first fire marshal of Portland and at present is chief of the bureau of fire prevention, San Francisco office of the National Board of Fire Underwriters. Jay was presented a gift by Host Chief Hal Simpson. Sharing the association's accolade with Jay was Portland's recently retired Chief Edward Grenfell who was also presented a testimonial plaque. Retiring association president, Chief J. T. Caldwell was another who was honored with a gift presented by his successor, Chief Klinger.

Officers elected for the coming year are: President, Keith E. Klinger, Los Angeles County; first vice president, Chief Ivan L. Pearson, McMinnville, Ore.; second vice president, Chief James J. Sweeney, Jr., Oakland, Calif.; secretary-treasurer, Jay W. Stevens, San Francisco; Chief William J. Taylor, Burbank, Calif., was re-elected as director, International Association of Fire Chiefs. □□

Modern supervisory service such as this Seattle ADT central station, offers automatic detection and fire alarm systems for mercantile, industrial and other hazards in the area. Operators are on duty 24-hours a day to receive and transmit alarms indicating fire, burglary, etc. and to supervise continuous testing, inspection and maintenance details of the systems—*Photo by American District Telegraph Co.*

Better Sell Automatics!

The large-loss fire trend and multiplicity of new hazards are increasing the already heavy burdens on the fire service. Teaming up with automatic detection, warning and extinguishing systems is recommended as the best large-loss preventive measure

By PAUL W. KEARNEY*

Paul Kearney, author of the accompanying article, whose writings on fire protection and prevention are legion, has watched from the side lines as a competent judge, the life and death struggle between deadly destructive fire and those charged with the heavy task of keeping it within safe bounds.

Mr. Kearney was asked to prepare this message expressly for FIRE ENGINEERING and in so doing, to pull no punches and play no favorites.

In his lexicon and our own, the only way to prevent large fires is to catch them while they are young, and that can best be done by adoption of modern scientific principles and practices of fire detection, notification and extinguishment.

This story, and others in this issue of FIRE ENGINEERING, support this sound conclusion. The "instruments" to prevent these large losses, both property and lives, are ready to hand. Their effectiveness is being demonstrated day by day in almost every occupational category. But the percentage of business and industrial properties and places of public assembly which rely on these modern scientific improvements and profit by their installation, is almost insignificant, compared to the potential of those that should do so.

Neither the author nor the editors of this journal expect that Utopian day to arrive when all property—business, industrial, places where people assemble, including churches, hospitals, homes for the aged and so forth, will be fully and automatically safeguarded against fire. But that is no reason for our not striving toward that goal.—The Editors

AT THE NOVEMBER MEETING of the International Association of Fire Chiefs, in Miami, Research Director Mathew M. Braidech, of the National Board of Fire Underwriters, read the tea leaves with a rather disturbing clairvoyance.

"It is noteworthy," said he, "that the I. C. C. regulations now list some 8,000 commodities of commerce as hazardous, and that nearly 2,000 of these require special labeling, either as explosive, corrosive, toxic, radioactive, or fire-causing chemicals. These include some 500 commonly employed combustible liquids and nearly 1,000 hazardous chemicals which today add to the burden of the fire service.

"It is expected that research and industrial development will contrive to bring forth *new materials and processes which may present fire and explosion problems of increasing hazard severity, with a greater magnitude of damage essential*—for which advance planning will be required to provide effective controls." The italics are mine!

In the face of this situation, we are confronted with two serious roadblocks to progress:

1. The reluctance of industry in general to shoulder its rightful share of the protection responsibility

2. Deep public apathy stemming from complete unawareness of the gravity of the problem.

The situation is being further complicated by the growing trend of industry to move outside the corporate limits, and by the current fantastic "economy movement" to castrate the fire service by

* Paul Kearney is an honorary life member of the International Association of Fire Chiefs and the author of "I Smell Smoke!"

Delayed discovery and notification of fire department are given as basic causes for many of the large loss fires—including this $2 million, five-alarm Atlanta unsprinklered warehouse blaze which killed an assistant chief, critically injured a captain and hospitalized 13 others —*Frank Tuggle Atlanta Journal—Constitution Photo*

merging it with the police, instead of fortifying and expanding it to meet present situations.

The final straw which is going to send the camel to the osteopath is the National Fire Protection Association's annual report on large-loss fires published in its April *Quarterly*. Not only is the trend upward straight across the board, but in three categories the jump in devastating fires is startling: Industrial occupancies; residential and institutional; and churches.

If you haven't seen the figures, here is a quick summary:

Total number of large-loss fires ($250,000 or more) in 1956, 430 as against 316 in 1955. Number of million-dollar blazes up from 61 to 86. Aggregate loss for all outbreaks, $330,156,000—an increase of $55 million-plus over the previous year. This is roughly 25 per cent of the national fire loss for the year, and more than the damages in all of our dwelling fires combined.

Large-loss industrial fires were up from 78 to 117. Residential and institutional skyrocketed from 9 to 24. And major church fires equalled the losses in that division for the past three years combined.

This is a dreary picture, indeed, after 50 years of stress on fire prevention. And one of its most depressing aspects is that the same threadbare reasons for the excessive losses that have been kicking around for all these 50 years are still claiming the headlines. Over and over throughout the report you see the familiar phrases: Excessive, unbroken areas; unprotected vertical arteries; highly combustible interior trim, finish or decoration; contents too hazardous for the type of structure; inadequate water supply; belated discovery or delayed alarm; sprinkler protection lacking or inadequate.

Lessons in large losses

Thus we see a rerun of the same old hackneyed "silent movie" featuring the solid, successful VIP who has the acumen and the drive to amass more assets than you or I can ever dream of owning—but lacking the foresight to safeguard them against going up in smoke! All of which is pointed up by some of the ludicrous situations developed in case histories of a few of these large-loss fires, to wit:

Rochester, Minn.: Firemen responding to alarm for an outbreak in the basement of a retail chain store could not get down the front stairway because of intense heat and smoke. Resorting to an-

Continued on page 879

WHAT SHOULD A FIRE CHIEF ASK ABOUT AN AUTOMATIC FIRE ALARM SYSTEM?

How long has the system been on the market and how extensively is it used?

Does it have a long-time record of efficient performance?

Are all components listed by Underwriters' Laboratories, Inc.?

Is it of a type suitable for the occupancy?

Is the installing agency experienced in fire alarm work?

Is the equipment inspected and tested regularly and maintained under an adequate contract?

Is there any divided responsibility for maintenance?

Is the maintaining agency competent and responsible?

If the alarm is associated with automatic sprinklers, is the sprinkler system under central station supervision and is it periodically inspected by the sprinkler contractor?

Recent devastating church fires, such as this $3 million Hartford Cathedral blaze, has resulted in an upsurge of installations of automatic fire detection, alarm notification and sprinkler systems in these occupancies —*Hartford Courant Photo*

Mobile Foam Equipment Plays Bigger Role in Controlling Fire in Refineries and Chemical Plants

By DR. EDWARD C. HOLMES
Engineering Dept., National Foam System, Inc.

THE DEVELOPMENT of mechanical foam liquids in the early forties brought wide changes in the techniques of fighting fire in flammable liquids—changes that are becoming more widespread each year.

Many of these changes, of course, involve methods of producing foam, such as by means of foam-makers and nozzles.

Equally important, in the petroleum and chemical fields especially, is the switch of emphasis from foam houses and fixed piping systems to mobile foam units—trucks, trailers, cars.

Two factors led to this development. One is the high cost of installing and maintaining underground piping systems. The other is a succession of improvements in mobile equipment and in methods of proportioning foam liquids thus transported.

One refinery's problem

A problem faced several years ago by a large, established refinery is typical of the conditions that brought about the trend to mobile equipment.

This refinery was ready to construct new, larger storage tanks requiring foam protection. Its old chemical foam system lacked the capacity needed for the planned expansion. In addition, much of the underground foam piping had deteriorated badly. It was evident that the entire underground foam piping system would have to be replaced at great cost, and that tanks would remain unprotected while replacement work was in progress.

An ingenious answer to the problem was suggested; abandon the underground foam piping system entirely, use mobile sources of foam liquid supply, and take the required water from the existing fire main system.

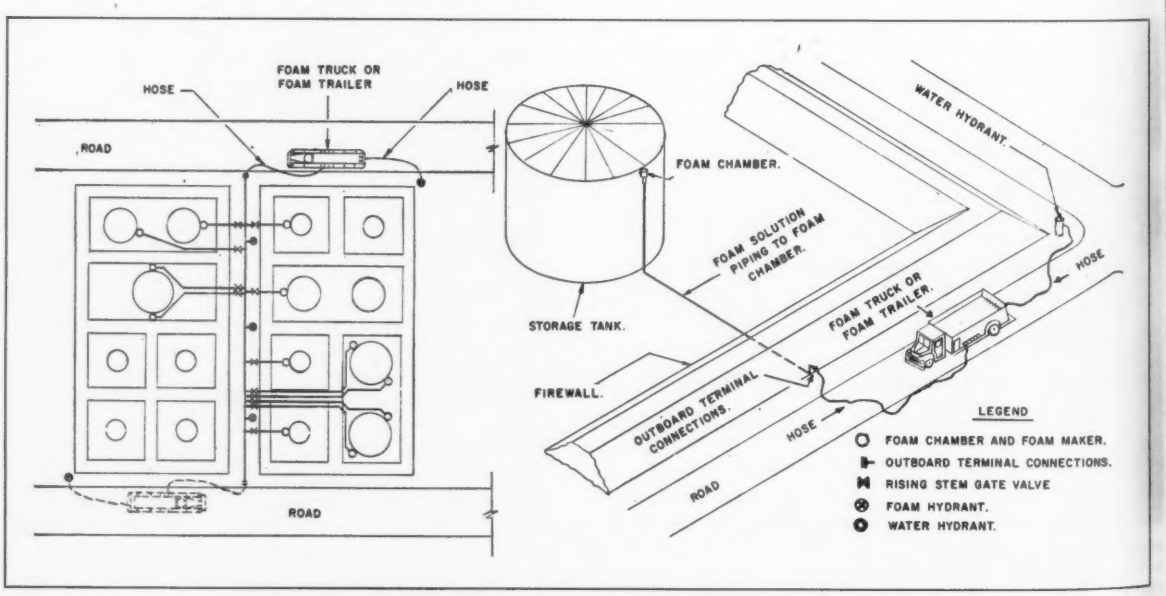
This arrangement assured adequate, round-the-clock protection for both existing and future storage tanks.

The foam solution piping leading from the dike walls to the foam chambers was found to be in good condition. This above-ground piping was disconnected from the abandoned underground system and hose connections were attached. Existing chemical foam chambers were equipped with especially designed mechanical foam makers. Thus, with foam liquid supplied by foam trucks and water readily available from the fire main at adequate pressure, the arrangement provided ample protection for all tanks.

New developments in foam trucks

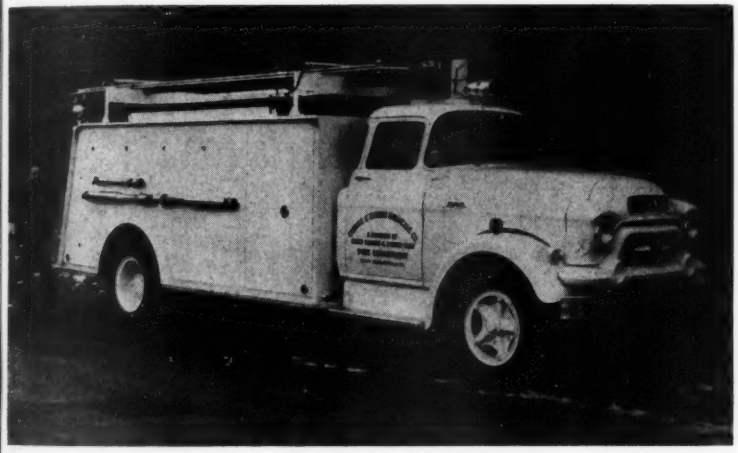
The plan evolved for this one refinery soon became a pattern for other refineries, both old and new. To increase the efficiency of the required mobile equipment, improvements in pumping and proportioning systems were developed. In addition to foam liquid pumps, for example, many trucks are provided with pumps to boost water pressure, where required, or to allow the trucks to work from draft in emergencies.

Where suitable prime movers were available, specialized trailers were devel-

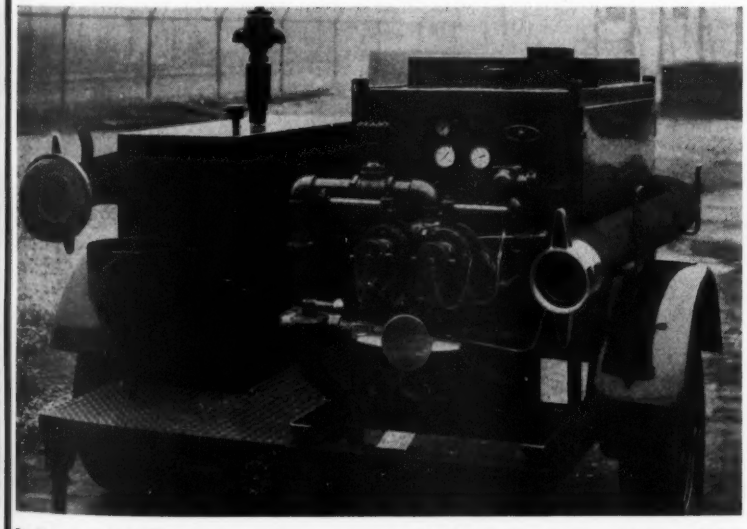


Typical foam system installations for protecting flammable liquid storage areas

Industrial foam pumper mounts Class A fire pump and 1,000-gallon foam liquid storage tank. A unique feature of this "foam house on wheels" is a special indicating proportioner which assures just the correct mixture of foam liquid and water



This Class A industrial pumper can handle any type fire. It includes tanks for polar solvent type foam liquid and wetting agent, and indicating proportioners which require operation of only a single valve to insure correct mixture of water and foam, or wetting agent



Trailer-mounted fire pump capable of producing 33,000 gallons of foam without refilling the 100-gallon foam liquid tank. Its built-in pump proportioner easily regulates the correct marriage of foam and water. Tank trailers are also available to provide additional supplies of foam liquid

oped with engine-driven pumps. Tank trailers were also provided to transport additional supplies of foam liquid.

One of the most interesting features of these new trucks and trailers is the indication proportioning system, which it is said has been accepted as a standard for this type of operation.

In this type of proportioning, a meter in the water supply line indicates the flow of water through the truck. Foam liquid coming from the pump, flows through a second meter before it enters the water line. The operator merely observes the reading on the water meter, and adjusts a single valve to regulate the flow of foam liquid to coincide and thus form the correct mixture of foam liquid and water.

"Foam house on wheels"

Foam trucks thus equipped have been called "foam houses on wheels." Operated by only one man, the vehicle makes possible much greater flexibility in foam system design for refineries and chemical plants. Elimination of fixed underground piping systems results in substantially lower costs.

If fire occurs, the truck is driven to a point adjacent to a fire hydrant and to the terminal hose connections on the lateral piping leading to the tank. After hose has been connected and water is flowing through the apparatus to the foam chambers, the operator engages the liquid proportioning pump to inject foam liquid at the proper rates, as described. □□

New Trial In Boston Arson Case

Edward A. Reynolds, 58, of Jamaica Plain, Mass., was convicted in 1954 of being an accessory to three murders and arson in connection with a fire that killed three residents of a building he owned in Boston's South End. In 1956 the State Supreme Court set aside his life sentence and ordered a new trial for the defendant.

The court found that the prosecution had introduced prejudicial evidence at his trial. Reynolds was released in $10,000 bail and a new trial date set.

Tennessee Mutual Aid Law

An enabling act, Public Chapter No. 223, has been passed by the Legislature of the State of Tennessee and signed by Governor Frank G. Clement, which authorizes incorporated cities and towns to enter into contracts with and furnish one another assistance in fighting fires. It provides that in answering outside fire calls, the incorporated city or town and its employees shall act in a governmental capacity, and it grants to employees of fire departments all rights, privileges, exemptions and immunities as if performing duties within the corporate limits of the city or town by which employed.

Asst. Chief Earl F. Olson

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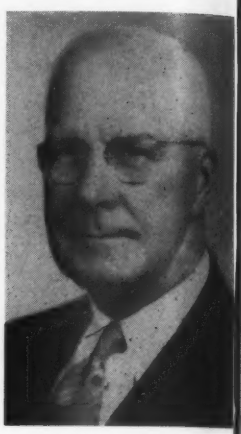

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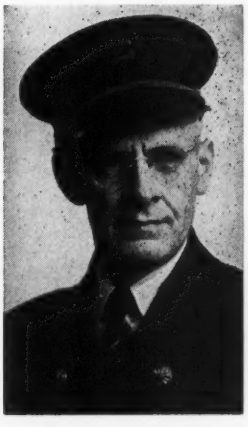

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PROGRAM

I.A.F.C. Conference, New Orleans, La.

Sunday, September 8

10:00 a.m. Registration—Hotel Roosevelt
3:00 p.m. Open House at Exhibit Hall—Auditorium
5:00 p.m. Directors Meeting—Hotel Roosevelt
Division Associations will meet during the day —time and place to be announced

Monday, September 9 (Chief Wayne E. Swanson, presiding)

9:00 a.m. Registration—Auditorium
10:00 a.m. Opening session and Memorial Services
12:00 noon Review of New Orleans F. D. equipment
1:30 p.m. Business and technical session
2:30 p.m. **The Status of Working Hours of Fire Department Personnel**—John Redmond, President, International Association of Fire Fighters
2:45 p.m. **Why the Increase in Large Loss Fires?**—George Robinson, Assistant Chief Engineer, National Board of Fire Underwriters
3:15 p.m. **The Increasing Importance of the Fire Service in Civil Defense**—The Hon. Lewis Berry, Acting Administrator, FCDA

Tuesday, September 10 (Chief Donald S. Charles, presiding)

9:30 a.m. Business session, report of Nominating Committee
10:00 a.m. **Progress in the Home Fire Inspection Program** —Jay W. Stevens, Chairman, IAFC Fire Prevention Committee
10:15 a.m. **What the Fire Service Should Know about Atomic Energy**—Frank L. Brannigan, Safety Engineer, Safety and Fire Protection Branch, United States Atomic Energy Commission
10:45 a.m. **The Case for the Volunteers**—Chief Donald Holbrook, Chairman, IAFC Volunteer Committee, introducing Olin Culberson, Chairman, Railroad Commission of Texas
12:00 noon Sessions adjourned
1:30 p.m. **What We Should Do about Church Fires**—Chief Leo C. Driscoll, Boston, Mass.
2:00 p.m. **What Boy Scouts Mean to the Fire Service**—Chief Albert W. Kimball, Hingham, Mass., Chairman, IAFC Boy Scout Committee
2:15 p.m. **A New Interior Alarm System Utilizing Nuclear Energy**—Chief Harold Burke (ret.), New York Fire Department
2:45 p.m. **What Improvements Are Needed in Fire Apparatus Design**—Panel discussion with Roi B. Woolley, Editor, FIRE ENGINEERING, Moderator; Chief Edward J. MacDonald, White Plains, N. Y.; Chief Edward Wischer, Milwaukee, Wis.; and Chief Daniel F. Vogel, Cincinnati, Ohio
8:00 p.m. Fire Chiefs' Ball and Floor Show—Municipal Auditorium

Wednesday, September 11 (Chief R. C. Malmquist, presiding)

9:30 a.m. Business session and election of officers (polls close at 1:00 p.m.)
10:00 a.m. **What a Special Study of Fire and Police Integration Revealed**—William J. Scott, Fire Marshal, Province of Ontario
10:30 a.m. **The Forward Look in Fire Station Design**—W. Thomas Schaardt, Architect, Bellmore, N. Y., introduced by C. T. McGraw, Circul-Air Corporation
11:00 a.m. **As the Fire Commissioner Sees the Fire Service** —Panel discussion with Chief R. C. Malmquist, Minneapolis, Minn., Moderator; Joseph P. Sestric, Director of Public Safety, St. Louis, Mo.; Claude A. Armour, Commissioner of Fire and Police, Memphis, Tenn., and Paxton Mendelssohn, Board of Fire Commissioners, Detroit, Mich.
12:00 noon Sessions adjourn
2:00 p.m. Trip on Steamer "President" sightseeing on Mississippi and along New Orleans waterfront
8:00 p.m. Annual Banquet—Main Ball Room, Roosevelt Hotel

Thursday, September 12 (Chief Donald S. Charles, presiding)

9:30 a.m. Business session including committee reports and installation of officers

THE Fyr-Fyter NEWS

(FIRE) (FIGHTER)

FIRE DEPARTMENT EDITION

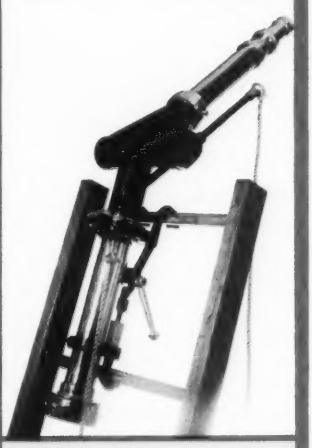
No. 4 | PUBLISHED MONTHLY BY FYR-FYTER DIVISION, FYR-FYTER CO. | AUGUST, 1957

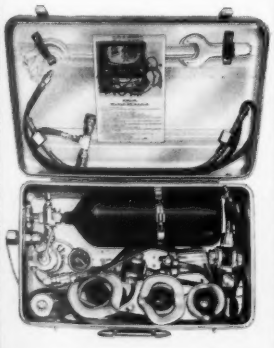
Fyr-Fyter Products To Spark I. A. F. C.

When members of the International Fire Chief's Association gather at New Orleans, La. Sept. 8th, Fyr-Fyter will be there to greet them with a comprehensive display of its newest products. The manufacturers and distributors of more than 1,200 items of fire fighting equipment, Fyr-Fyter leads the industry as a single source of supply for Fire Departments around the world.

Fyr-Fyter is headquarters for municipal and industrial fire hose. This year our newest first line, double jacket municipal hose—Super Fyr-Strype—has taken its place alongside such fine hose products as our well known Super Fyr-Flex XL and Super Fyr-Flex 600 and 400. The acceptance of Super Fyr-Strype has been immediate. If you haven't seen it yet, look for it at New Orleans.

The Wooster Brass Division of Fyr-Fyter forges and casts brass goods for every fire department application. Wooster's fog nozzles, deluge nozzles, valves, couplings, strainers and fixtures are all precision products, painstakingly engineered for maximum performance. In an effort to produce the finest, Wooster is constantly developing new brass goods. These too, will be at New Orleans.





Because the fireman's safety has always been one of the chief concerns of Fyr-Fyter, we take pride in the new Fyr-Fyter Seeler Resuscitator and the latest Fyr-Fyter Air Mask. Both represent modern, efficient breathing and rescue equipment, and play a key part in our design for protection. Our new helmets and coats are also a part of this safety pattern. Inspect these products at New Orleans.

Fyr-Fyter has been manufacturing extinguishers for over 40 years. In that time we have introduced many fine products, but none has seemed quite as important as our new Pressurized Instant — now being manufactured. It is the latest and finest addition to a complete line of Dry Chemical, Carbon Dioxide, Foam, Water and VL extinguishers. Meet the new Instant at New Orleans.

SPECIFY WOOSTER

for dependability . . . top performance . . .

FAMOUS VARI-A-FOG NOZZLE . . .

Does everything you want a nozzle to do—more effectively, faster, easier. The answer to every fire fighting situation is right at your fingertips. Five positive click-stop settings give you a full choice of dense fog patterns or a solid straight stream. Available in 1", 1½" and 2½" sizes with a wide choice of GPM ratings. Easy-acting, non-locking ball shut-off. Beautifully engineered, precision built—a joy to use.

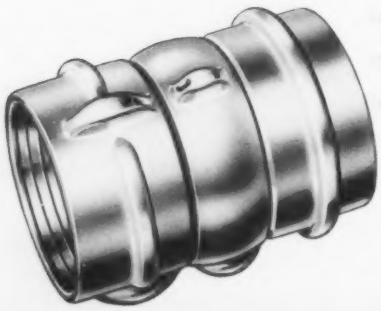
WOOSTER'S NEW VARI-A-FOG BREAK-APART NOZZLE

Fire fighting engineers like the versatile features incorporated in this nozzle. Break-apart permits adding line or applicator without shutting down at pump. Your choice of threads between ball shut-off and dial stream control unit. Without ball shut-off it is still a complete fire-fighting unit because barrel will shut off water when turned below straight stream setting. Available in 1", 1½" and 2½" sizes.

WORM AND GEAR CONTROLLED LADDER PIPES

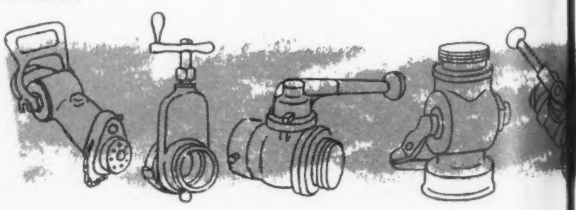
Completely redesigned for lowest friction loss. Now made of lightweight aluminum alloy for faster and easier handling. New eccentric, snap-on ladder locks mean positive attachment without fumbling. Easy horizontal positioning from ladder. Ball bearing swivels for vertical positioning from ladder or ground. Stays in any set position. Also available in hand-operated model.

STANDARDIZE ON MANGA-FORGE COUPLINGS



- FOR STRENGTH
- LIGHTNESS
- GREATER DURABILITY

Coupling description for including in your hose specifications—Couplings to be forged from manganese-bronze alloy, with reinforcing rings located at the mid-section of the hose bowls. Three rocker type lugs on the male and swivel with Higbee indicator.



BRASS!

. . . widest selection

for all your FOG NOZZLE and DELUGE NOZZLE requirements

3-INLET, GEAR OPERATED PORTABLE DELUGE NOZZLE

By actual test, Wooster deluge nozzles have less friction loss. Low center of gravity design assures "stay-put" service at any angle without attention. Smooth ball-bearing operation through 360° rotation and 20° to 90° elevation. Use from one to three hose lines. Automatic check valves close ports not in use. Top-of-truck and running board mounts available. (Also available in two and four inlet style.)

WOOSTER FOG MASTER FOR VOLUME STREAMS

Another precision-built Wooster nozzle to meet the growing demand for fog discharges on master streams such as deluge nozzles and ladder pipes. Also used with direct connection hand grip on 2½" hose with high GPM discharge. Provides a full range of dense fog patterns by simply turning barrel. Available in 500 GPM and 1000 GPM ratings.

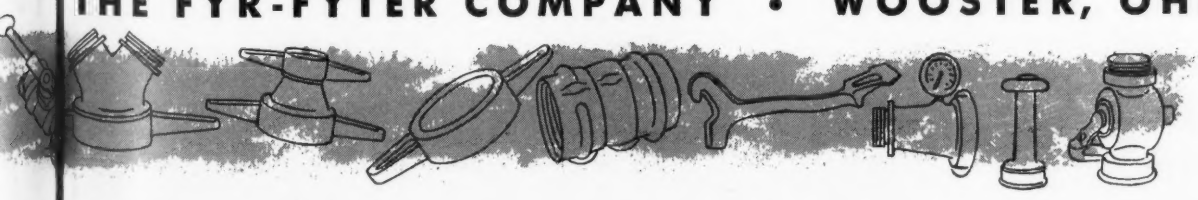
WOOSTER PERMANENT MOUNTED DELUGE GUNS

An economical volume gun for fire trucks, fire boats and industrial fire protection. Available in lever operated model as well as worm and gear operated style shown here. All bronze construction. Discharge pipe 2¾" ID. Maximum discharge 2000 GPM. O-ring construction with ball bearing races makes these pipes easy to turn at any pressure.

Many other nozzles also available — see your Wooster Brass Catalog!

WOOSTER BRASS DIVISION

THE FYR-FYTER COMPANY • WOOSTER, OHIO



IT'S SUPER FYR-STRYPE FOR THREE PA. DEPTS.

The first fire company in the United States to buy Super Fyr-Strype, the Everett, Pa. V.F.D. has a long history of success. Formed in 1896, the Everett V.F.D. now has 68 active members. Their apparatus includes three pumpers and a squad car; and, in this photo, Hose Foreman Francis Ritchey (far right) stands over the first section of Super Fyr-Strype being loaded. Chief McFarland (white helmet) states that in addition to increased durability, he can get double his former hose load with Super Fyr-Strype.

Fyr-Fyter Sales and Service Representative Harry Wakefield (at left), who supplied all the departments on this page with their Super Fyr-Strype, checks a delivery with George Miley. The hose is now in use on the apparatus of the State College, Pa. Fire Company. The glistening truck is one of nine pieces of equipment used by the 125 members of the 57 year old company. That's 550 feet of 2½", and 200 feet of 1½" Super Fyr-Strype along the bumper. State College Chief Tom Sauers says this hose is a vast improvement over any other hose he's tried. The Chief is also pleased that Wooster Brass Manga-Forge couplings are standard on all lengths of Super Fyr-Strype.

Quick to recognize the advantages of a hose with 100% Dacron strips over the total outer jacket fold area, the Boalsburg Pa. Fire Company recently ordered 250 feet of Fyr-Fyter's newest first-line municipal hose — Super Fyr-Fyter. Fold area deterioration accounts for 90% of hose wear in ordinary cotton hose. Now, Decron prevents this. Another Pa. Department over half a century old, Boalsburg has eighty members on the roll who were all amazed at the lightness and flexibility of Super Fyr-Strype. It coils and uncoils like lightning, making loading and unloading swift, sure and simple.

WHERE TO BUY

Directory of Equipment For Fire Departments

This special feature is provided for the guidance and convenience of fire officials and others concerned with the purchase of fire equipment. The companies listed comprise those whose products have recently been advertised in FIRE ENGINEERING and are thus now actively serving the fire protection field. For information on any type of equipment not listed, address Readers' Service Dept., FIRE ENGINEERING, 305 East 45th St., New York 17, N. Y.

Every effort is made to insure the completeness and accuracy of directory sections. However, this information is published as a service, and no guarantee against errors or omissions is expressed or inferred. Additions or corrections are invited at any time. Please address the publisher.

APPARATUS, MOTOR

APPARATUS

Ambulances

Approved Fire Equipment, Co., Inc.
Christopher Co., The
Four Wheel Drive Auto Co.
Gold Crest Safety Equipment Corp.
International Harvester Co.
Miller-Meteor Motor Car Div., Divco-Wayne Corp.
Sharpsville Steel Fabricators, Inc.
Superior Coach Corp.
Ward LaFrance International, Inc.

Chassis

Ford Motor Co.
International Harvester Co.

Crash Trucks

American Fire Apparatus Co.
American LaFrance Corp.
Approved Fire Equipment Co., Inc.
Bean, John Div., Food Machinery & Chemical Corp.
Central Fire Truck Corp.
Christopher Co., The
Darley, W. S., & Co.
Fire Master Corp.
Four Wheel Drive Auto Co.
Gold Crest Safety Equipment Corp.
H & H Fire Apparatus Corp.
Halprin Supply Co.
Howe Fire Apparatus Co.
International Harvester Co.
Kidde, Walter & Co., Inc.
Mack Trucks, Inc.
Maxim Motor Co.
Oren Roanoke Corp.
Seagrave Corporation
Sharpsville Steel Fabricators, Inc.
Universal Fire Apparatus Corp.
Valley Fire Truck Co.
Ward LaFrance International, Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Foam Trucks

National Foam System, Inc.

Industrial Trucks (In Plant)

Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Young Fire Equipment Corp.

Ladder Trucks, Aerial

American Fire Apparatus Co.
American LaFrance Corp.
Approved Fire Equipment Co., Inc.
Central Fire Truck Corp.
Darley, W. S. & Co.
Four Wheel Drive Auto Co.
Howe Fire Apparatus Co.
International Harvester Co.
Mack Trucks, Inc.
Maxim Motor Co.
Oren Roanoke Corp.
Pirsch, Peter, & Sons Co.
Seagrave Corporation
Sharpsville Steel Fabricators, Inc. (Junior)
Universal Fire Apparatus Corp.
Ward LaFrance International, Inc.
Ward LaFrance Truck Corp.

Ladder Trucks, Service

American Fire Apparatus Co.
American LaFrance Corp.
Approved Fire Equipment Co., Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Central Fire Truck Corp.
Christopher Co., The
Darley, W. S., & Co.
Four Wheel Drive Auto Co.
Gold Crest Safety Equipment Corp.
H & H Fire Apparatus Corp.
Halprin Supply Co.
Howe Fire Apparatus Co.
International Harvester Co.
Mack Trucks, Inc.
Maxim Motor Co.
Oren Roanoke Corp.
Pirsch, Peter, & Sons Co.
Seagrave Corporation
Sharpsville Steel Fabricators, Inc.
Universal Fire Apparatus Corp.
Valley Fire Truck Co.
Ward LaFrance International, Inc.
Ward LaFrance Truck Corp.

Pumpers And Hose Cars

American Fire Apparatus Co.
American LaFrance Corp.
Approved Fire Equipment Co., Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Boardman Co., The, Fire Apparatus Div.
Central Fire Truck Corp.
Christopher Co., The
Darley, W. S., & Co.
Fire Master Corporation
Four Wheel Drive Auto Co.
Gold Crest Safety Equipment Corp.
H & H Fire Apparatus Corp.
Halprin Supply Co.
Howe Fire Apparatus Co.
International Harvester Co.
Mack Trucks, Inc.
Maxim Motor Co.
Oren Roanoke Corp.
Pirsch, Peter, & Sons Co.
Seagrave Corporation
Sharpsville Steel Fabricators, Inc.
Universal Fire Apparatus Corp.
Valley Fire Truck Co.
Ward LaFrance International, Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Pumpers, High Pressure Fog

American Fire Apparatus Co.
American LaFrance Corp.
Approved Fire Equipment Co., Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Boardman Co., The, Fire Apparatus Div.
Central Fire Truck Corp.
Christopher Co., The
Darley, W. S., & Co.
Fire Master Corporation
Four Wheel Drive Auto Co.
H & H Fire Apparatus Co.
Halprin Supply Co.
Howe Fire Apparatus Co.
International Harvester Co.
Mack Trucks, Inc.
Maxim Motor Co.
Oren Roanoke Corp.
Pacific Marine Supply Co.
Pirsch, Peter, & Sons Co.
Seagrave Corporation
Sharpsville Steel Fabricators, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance International, Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Rescue and Squad Trucks

American Fire Apparatus Co.
American LaFrance Corp.
Approved Fire Equipment Co., Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Boardman Co., The, Fire Apparatus Div.
Central Fire Truck Corp.
Christopher Co., The
Darley, W. S., & Co.
Four Wheel Drive Auto Co.
Gold Crest Safety Equipment Corp.
H & H Fire Apparatus Corp.
Halprin Supply Co.
International Harvester Co.
Mack Trucks, Inc.
Maxim Motor Co.
Oren Roanoke Corp.
Pirsch, Peter, & Sons Co.
Sharpsville Steel Fabricators, Inc.
Universal Fire Apparatus Corp.
Valley Fire Truck Co.
Ward LaFrance International, Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Tank Trucks

American Fire Apparatus Co.
American La France Corp.
Approved Fire Equipment Co., Inc.
Boardman Co., The, Fire Apparatus Div.
Central Fire Truck Corp.
Christopher Co., The
Darley, W. S., & Co.
Fire Master Corporation
Four Wheel Drive Auto Co.
Gold Crest Safety Equipment Corp.
H & H Fire Apparatus Co.
Howe Fire Apparatus Co.
International Harvester Co.
Mack Trucks, Inc.
Maxim Motor Co.
National Foam System, Inc.
Oren Roanoke Corp.
Pirsch, Peter, & Sons Co.
Sharpsville Steel Fabricators, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance International, Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Utility and Repair Trucks

Approved Fire Equipment Co., Inc.
Boardman Co., The, Fire Apparatus Div.
Christopher Co., The
Darley, W. S., & Co.
Four Wheel Drive Auto Co.
Gold Crest Safety Equipment Co.
H & H Fire Apparatus Corp.
International Harvester Corp.
Maxim Motor Co.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corporation
Young Fire Equipment Corp.

BATTERIES APPARATUS

Carpenter Manufacturing Co.
Delco-Remy Div., General Motors Corp.
Ray-O-Vac Co.

BATTERY CHARGERS

Darley, W. S., & Co.
Halprin Supply Co.
Katolight Corp.
Onan, D. W., & Sons, Inc.
Pioneer Gen-E-Motor Corp.

BRAKES, POWER, HYDRAULIC

Four Wheel Drive Auto Co.
Power Equipment Co.

ENGINES (Diesel or Gas)

Continental Motors Corp.
Detroit Diesel Engine Div., General Motors Corp.

(Continued on next page)

Engines (Diesel or Gas) *(Continued)*
Hall-Scott, Inc., Power Div.
Onan, D. W., & Sons, Inc.
Pioneer Gen-E-Motors Corp.
Waukesha Motor Company

GENERATORS, AUTOMOTIVE
Darley, W. S., & Co.
Delco-Remy Div., General Motors Corp.
Leece-Neville Co., The

HARDWARE FOR APPARATUS
American LaFrance Corp.
Darley, W. S., & Co.
Eastman, Samuel Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fire Master Corporation
H & H Fire Apparatus Corp.
Howe Fire Apparatus Corp.
Natale Machine & Tool Co. (Hold Down Clamps)
Universal Fire Apparatus Corp.

LADDERS, AERIAL
Four Wheel Drive Auto Co.
Maxim Motor Co.
Memco Aerial Ladder Co.
Sharpsville Steel Fabricators, Inc.
Ward LaFrance Truck Corp.

POWER STEERING, HYDRAULIC
Four Wheel Drive Auto Co.
Garrison Mfg. Company Inc.

SEAT BELTS
Oren Roanoke Corp.

SIGNS & EMBLEMS, APPARATUS
Cairns & Bro., Inc.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Gold Crest Safety Equipment Corp.
H & H Fire Apparatus Corp.
Halprin Supply Co.
Lane, E. B., Distributor (Plastic Signs)
Maxim Motor Co.
Nielson-Rionda, Inc.
Pacific Reflex Signs
Potter Engineering Co.
Wentworth-Forman Co., Inc.

WARNING DEVICES, APPARATUS

Bells
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Fire Master Corporation
Fyr-Fyter Co., The Fyr-Fyter Div.
Grinnell Co., Inc.
H & H Fire Apparatus Corp. (Automatic)
Halprin Supply Co.
Notifier Corp.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Lights
American LaFrance Corp.
Arguslite Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Carpenter Manufacturing Co.
Darley, W. S., & Co.
Federal Sign & Signal Corp.
Fire Master Corporation
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McDermott, Julian A., Corp.
Macchi & Co. (Flashers for Warning Lights)
Mars Signal Light Co.
Notifier Corp.
Portable Light Co., Inc., The
Safa Alarm Div., Inc., Fyr-Fyter Co., The
Sireno Co., Inc., The
Trippe Manufacturing Company
U-C Lite Manufacturing Co.
Universal Fire Apparatus Corp.
Whelen Engineering Co.
Willson Products Div., Ray-O-Vac Co.
Young Fire Equipment Corp.

Sirens
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Electronic Engineering Enterprises
Federal Sign & Signal Corp.
Fire Master Corporation
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Mars Signal Light Co.
Notifier Corp.
Sireno Co., Inc., The
Sterling Siren Fire Alarm Co., Inc.
Universal Fire Apparatus Corp.
Young Fire Equipment Corp.

Whistles
Bean, John, Div., Food Machinery & Chemical Corp.
Falcon Alarm Co., Inc.
Gamewell Company
Reese, S. H.
Safa Alarm Div., Inc., Fyr-Fyter Co., The
Snyder, M. L., & Son, Inc.

BOATS, FIRE

ENGINES, DIESEL OR GAS
Continental Motors Corp.
Hall-Scott, Inc., Power Div.
Onan, D. W., & Sons, Inc.

OUTBOARD MOTORS
Johnson Motors
Pacific Marine Supply Co.

CLOTHING

CLOTHING, PROTECTIVE

Aluminized, Insulated
Fyrpel Products, Inc.
Safety Clothing & Equipment Co.

Asbestos
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Halprin Supply Co.
Johns-Manville Corp.
Mine Safety Appliances Company
Safety Clothing & Equipment Co.
Snyder, M. L., & Son, Inc.

Belts
Atlas Safety Equipment Co., Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Cairns & Bro., Inc.
Darley, W. S., & Co.
Mine Safety Appliances Company
Russell Uniform Co.
Safety Clothing & Equipment Co.
Young Fire Equipment Corp.

Boots
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Body Guard Mfg. Co.
Buffalo Fire Appliance Corp.
Cairns & Bro., Inc.
Darley, W. S., & Co.
Eureka Fire Hose Div., U. S. Rubber Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Goodrich, B. F., Co., The
Halprin Supply Co.
Midwestern Safety Mfg. Co.
Snyder, M. L., & Son, Inc.
Young Fire Equipment Corp.

Gloves
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Cairns & Bro., Inc.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Johns-Manville Corp.
Mine Safety Appliances Company
Safety Clothing & Equipment Co.
Snyder, M. L., & Son, Inc.
Willson Products Div., Ray-O-Vac Co.

Goggles
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Cairns & Bro., Inc.
Mine Safety Appliances Co.
Safety Clothing & Equipment Co.
Willson Products Div., Ray-O-Vac Co.

Hats
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Cairns & Bro., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Halprin Supply Co.
Midwestern Safety Mfg. Co.
Mine Safety Appliances Co.
Safety Clothing & Equipment Co.
Snyder, M. L., & Son, Inc.
Willson Products Div., Ray-O-Vac Co.

Helmets
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Cairns & Bro., Inc.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Midwestern Safety Mfg. Co.
Mine Safety Appliances Company
Safety Clothing & Equipment Co.
Snyder, M. L., & Son, Inc.
Willson Products Div., Ray-O-Vac Co.
Young Fire Equipment Corp.

Innersoles
American LaFrance Co.
Cairns & Bro., Inc.
Darley, W. S., & Co.
Goodall Rubber Co.
Halprin Supply Co.

Rubber & Canvas
Body Guard Mfg. Co.
Cairns & Bro., Inc.
Darley, W. S., & Co.
Eureka Fire Hose Div., U. S. Rubber Co. (canvas)
Fyr-Fyter Co., The, Fyr-Fyter Div.
Globe Manufacturing Co. (canvas)
Goodall Rubber Co.
Goodrich, B. F., Co., The
Halprin Supply Co.
Janesville Apparel Co.
Midwestern Safety Mfg. Co.
Mine Safety Appliances Company
Morning Pride Mfg. Co.
Russell Uniform Co.
Snyder, M. L., & Son, Inc.

Suits, Quick Hitch
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Cairns & Bro., Inc.
Darley, W. S., & Co.
Globe Manufacturing Co.
Halprin Supply Co.
Janesville Apparel Co.
Morning Pride Mfg. Co.
Russell Uniform Co.

WEARING APPAREL, DRESS

Hats and Caps, Uniform
Cairns & Bro., Inc.
Darley, W. S., & Co.
Halprin Supply Co.
Mine Safety Appliances Company
Reese, S. H.
Russell Uniform Co.
Snyder, M. L., & Son, Inc.
Wentworth-Forman Co., Inc.

Shirts, Uniform
Darley, W. S., & Co.
Russell Uniform Co.

Uniforms
Darley, W. S., & Co.
Russell Uniform Co.

Woolen Socks and Mitts
Cairns & Bro., Inc. (Gloves & Mittens)
Morning Pride Mfg. Co. (Mitts)
Young Fire Equipment Corp.

COMMUNICATIONS

ALARM SYSTEMS

Alerting
Electronic Engineering Enterprises
Falcon Alarm Co., Inc.
Federal Sign & Signal Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Gamewell Company
Notifier Corp.
Safa Alarm Div., Inc., Fyr-Fyter Co., The

Automatic
American District Telegraph Co.
Falcon Alarm Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Gamewell Company
Grinnell Company, Inc.
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
Notifier Corp.
Phon Alarm Div., Angelus Industries
Pyrotronics, Div., Baker Industries, Inc.
Safa Alarm Div., Fyr-Fyter Co., The

Batteries
Gamewell Company
Ray-O-Vac Co.
Safa Alarm Div., Inc., Fyr-Fyter Co., The

Boxes
American LaFrance Corp.
Federal Sign & Signal Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Gamewell Company
Safa Alarm Div., Inc., Fyr-Fyter Co., The

Cable
Fyr-Fyter Co., The, Fyr-Fyter Div.

Central Station
American District Telegraph Co.
American LaFrance Corp.
Federal Sign & Signal Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Gamewell Company
Notifier Corp.
Safa Alarm Div., Inc., Fyr-Fyter Co., The

Home
American LaFrance Corp.
Falcon Alarm Co., Inc.
Halprin Supply Co.
Industrial Radio Corp.
Kidde, Walter, & Co., Inc.
Monitoradio Div., I. D. E. A.
Notifier Corp.

Industrial
American District Telegraph Co.
Electronic Engineering Enterprises
Falcon Alarm Co., Inc.
Federal Sign & Signal Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Gamewell Company
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
Notifier Corp.
Pacific Marine Supply Co.
Pyrotronics, Div., Baker Industries, Inc.
Safa Alarm Div., Inc., Fyr-Fyter Co., The

Institutional
American District Telegraph Co.
Electronic Engineering Enterprises
Falcon Alarm Co., Inc.
Federal Sign & Signal Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Gamewell Company
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
Notifier Corp.
Pyrotronics Div., Baker Industries, Inc.
Safa Alarm Div., Inc., Fyr-Fyter Co., The

Municipal
American LaFrance Corp.
Electronic Engineering Enterprises
Federal Sign & Signal Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Gamewell Company
Notifier Corp.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Safa Alarm Div., Inc., Fyr-Fyter Co., The

Radio
Bendix Radio Div., Bendix Aviation Corp.
Du Mont, Allen B., Laboratories, Inc.
General Electric Communication Products Dept.
Harron Labs.
Industrial Radio Corp.
Monitoradio Div., I. D. E. A.
Plectron Corp.
Pye Corporation of America

Recording Systems
Dictaphone Corporation
Gamewell Company
Notifier Corp.
Safa Alarm Div., Inc., Fyr-Fyter Co., The

Sirens, Air Horns, Whistles & Coders
American LaFrance Corp.
Darley, W. S., & Co.
Electronic Engineering Enterprises
Fairwood Co., The
Falcon Alarm Co., Inc.
Federal Sign & Signal Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Gamewell Company
Halprin Supply Co.
Howe Fire Apparatus Co.
Notifier Corp.
Safa Alarm Div., Inc., Fyr-Fyter Co., The
Sireno Co., Inc., The
Sterling Siren Fire Alarm Co., Inc.
Young Fire Equipment Corp.

Smoke
American District Telegraph Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Kidde, Walter, & Co., Inc.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Pyrotronics, Div., Baker Industries, Inc.
Safa Alarm Div., Inc., Fyr-Fyter Co., The

Tape Systems
Federal Sign & Signal Corp.
Gamewell Company
Notifier Corp.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The

LOUD SPEAKERS

Electronic Megaphones
Audio Equipment Co., Inc.
Darley, W. S., & Co.
Halprin Supply Co.
University Loudspeakers Inc.
Young Fire Equipment Corp.

Public Address Systems
Audio Equipment Co., Inc.
Du Mont, Allen B., Laboratories, Inc.
Electronic Engineering Enterprises
Safa Alarm Div., Inc., Fyr-Fyter Co., The
University Loudspeakers Inc.

RADIO

Mobile and Station
Bendix Radio Div., Bendix Aviation Corp.
Du Mont, Allen B., Laboratories, Inc.
General Electric Communication Products Dept.
Monitoradio Div., I. D. E. A., Inc.
Motorola Communications & Electronics Inc.
Pye Corporation of America

Portable
Bendix Radio Div., Bendix Aviation Corp.
Du Mont, Allen B., Laboratories, Inc.
Industrial Radio Corp.
Motorola Communications & Electronics Inc.
Pye Corp. of America

Receivers
Du Mont, Allen B., Laboratories, Inc.
General Electric Communications Products Dept.
Harron Labs
Industrial Radio Corp.
Monitoradio Div., I. D. E. A., Inc.
Plectron Corp.
Pye Corporation of America

TELEPHONE-EMERGENCY
Gamewell Company
Mine Safety Appliances Company
Notifier Corp.

TRAFFIC CONTROL EQUIPMENT
Darley, W. S., & Co.
Eagle Signal Corp.
Electronic Protection, Inc., Sub. Standard Coil Products Co., Inc.

EXTINGUISHERS

EXTINGUISHERS

CO2
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fire Masters Corporation
Fyr-Fyter Co., The, Fyr-Fyter Div.
General Air Products Corp.
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
Pacific Marine Supply Co.
Pyrene C-O-Two Div., Fyr-Fyter Co., The
Red Comet, Inc.
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Chimney Fire
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Foard, F. C., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Pacific Marine Supply Co.
Red Comet, Inc.
Young Fire Equipment Corp.

Dry Chemical
American LaFrance Corp.
Ansul Chemical Company
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
General Air Products Corp.
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Red Comet, Inc.
Safety First Products Corp.
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Foam
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
General Air Products Corp.
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
National Foam System, Inc.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Red Comet, Inc.
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Co.

Pressurized Water
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Champion Sprayer Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
General Air Products Corp.
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Safety First Products Corp.
Snyder, M. L., & Son, Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Soda & Acid
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliances Corp.
Darley, W. S., & Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
General Air Products Corp.
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
National Foam System, Inc.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Red Comet, Inc.
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Vaporizing Liquid
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
General Air Products Corp.
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
National Foam System, Inc.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Red Comet, Inc.
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Water
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Champion Sprayer Co.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
General Air Products Corp.
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
Martin, R. & E.
Parco Products Co.
Protectoseal Company
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Red Comet, Inc.
Smith, D. B., & Co., Inc.
Snyder, M. L., & Son
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

EXTINGUISHING SYSTEMS (Sprinklers)

Automatic Sprinkler Supervision
American District Telegraph Co.

CO2
American LaFrance Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Grinnell Co., Inc.

(*Continued on next page*)

CO_2 (Continued)

Kidde, Walter, & Co., Inc.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Dry Chemical

Fyr-Fyter Co., The, Fyr-Fyter Div.
Grinnell Co., Inc.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The

Foam

American LaFrance Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Grinnell Co., Inc.
Kidde, Walter, & Co., Inc.
National Foam System, Inc.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Water

Grinnell Co., Inc.
Myers, F. E., & Bro., Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The

EXTINGUISHING AGENTS

Foam-Chemical-Liquid

American LaFrance Corp.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Kidde, Walter, & Co., Inc.
Martin, R. & E.
National Foam System, Inc.
Nicerol, Ltd.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Rockwood Sprinkler Company
Snyder, M. L., & Son, Inc.
Young Fire Equipment Corp.

Wetting Agents

American LaFrance Corp.
Darley, W. S., & Co.
Deynor Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Martin, R. & E.
National Foam System, Inc.
Rockwood Sprinkler Company
Snyder, M. L., & Son, Inc.
Young Fire Equipment Corp.

FIRE DEPARTMENT APPLIANCES & SUPPLIES

BADGES, INSIGNIA, ETC.

American LaFrance Corp.
Blackinton, V. H., & Co., Inc.
Braxmar, C. G., Co., Inc., The
Buffalo Fire Appliance Corp.
Cairns & Bro., Inc.
Darley, W. S., & Co.
Everson-Ross Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Gold Crest Safety Equipment Corp.
Halprin Supply Co.
Nielsen-Rionda, Inc.
Reese, S. H.
Russell Uniform Co.
Wentworth-Forman Co., Inc.
Young Fire Equipment Corp.

BLANKETS, FIRE

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Fulton Bag & Cotton Mills
Halprin Supply Co.
Johns-Manville Corp. (asbestos)
Medical Supply Co.
Mine Safety Appliances Company
Safety Clothing & Equipment Co.
Sawyer, H. M., & Son, Div., Sawyer-Tower, Inc.

BROOMS, FIRE FIGHTING

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Mason-Worcester Brush Co., Worcester Brush & Scraper Co., Div. (also Chimney Brushes)
Perfex
Young Fire Equipment Corp.

BROOMS, SAFETY

Perfex

EJECTORS AND EXHAUSTERS, SMOKE

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Mountain States Equipment Co.
Super Vacuum Mfg Co., Inc.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

FIRE ESCAPES

Portable

Atlas Safety Equipment Co., Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Snyder, M. L., & Son, Inc.

FOAM GENERATORS OR PUMPS

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Hale Fire Pump Co.
Halprin Supply Co.
National Foam System, Inc.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Snyder, M. L., & Son, Inc.
Waterous Company
Young Fire Equipment Corp.

FUND RAISING DEVICES

Hanford-Brown Co.
Sullivan, H. A., Co.

GAUGES

Compound

Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Halprin Supply Co.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Co.

Piezometers

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Halprin Supply Co.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The

Pressure

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The

Testing

Akron Brass Mfg. Co., Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The

GENERAL FIRE DEPT. SUPPLIES

Brooks, Earl A.
Howe Fire Apparatus Co.
Oren Roanoke Corp.
Smith, D. B., & Co., Inc.
Super Vacuum Mfg. Co., Inc.

LADDERS

Metal

Aluminum Ladder Co. (Aluminum)
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Cornelius Co., The
Darley, W. S., & Co.
Duo-Safety Ladder Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Howe Fire Apparatus Co.
Pirsch, Peter, & Sons Co. (Aluminum)
Sharpsville Steel Fabricators, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Rope

Atlas Safety Equipment Co., Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Cornelius Co., The
Fyr-Fyter Co., The, Fyr-Fyter Div.
Young Fire Equipment Corp.

Wood

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Apparatus Corp.
Cornelius Co., The
Darley, W. S., & Co.
Duo-Safety Ladder Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Howe Fire Apparatus Co.
Maxim Motor Co.
Pirsch, Peter, & Sons Co.
Sharpsville Steel Fabricators, Inc.
Stephenson Corporation
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

LIFE BELTS

American LaFrance Corp.
Atlas Safety Equipment Co., Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Cairns & Bro., Inc.
Darley, W. S., Inc.
Halprin Supply Co.
Wooster Brass Div., Fyr-Fyter Co., The

LIFE GUNS

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Naval Co.
Pacific Marine Supply Co.

NETS, LIFE AND TRAINING

American LaFrance Corp.
Atlas Safety Equipment Company, Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Halprin Supply Co.

PHOTOGRAPHIC EQUIPMENT

Dexter Folder Co., Filmsort Div. (Micro-Filming)
Graflex, Inc. (Cameras)

PROPORTIONERS AND EDUCTORS, WET WATER & FOAM

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Deynor Corp.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Hale Fire Pump Co. (Foam)
Halprin Supply Co.
National Foam System, Inc.
Rockwood Sprinkler Company
Young Fire Equipment Corp.

RUST PREVENTATIVES

Dakota Chemical Co.
Martin, R. & E.

SALVAGE COVERS

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Cairns & Bro., Inc.
Darley, W. S., & Co.
Fulton Bag & Cotton Mills
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Hoosier Tarpaulin & Canvas Goods Co., Inc.
Sawyer, H. M., & Son, Inc., Div., Sawyer-Tower, Inc.

SEARCH AND RESCUE EQUIPMENT

Aquatic Equipment Co.

SLIDING POLES, FIRE STATION

McIntire, F. N., Brass Works, Inc.

SMOKE & ODOR REMOVERS

American LaFrance Corp.
Foard, F. C., & Co.
Mountain States Equipment Co.
Neep Equipment Co.
Super Vacuum Mfg. Co., Inc.

SMOKE BOMBS

Superior Signal Co., Inc.

THAWING EQUIPMENT, HYDRANT
American LaFrance Corp.
Darley, W. S., & Co.
Smith, D. B., & Co.
Universal Fire Apparatus Corp.

THREAD CUTTING EQUIPMENT
Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Halprin Supply Corp.
Wooster Brass Div., Fyr-Fyter Co., The

TRAINING AIDS
A & W Specialty Co.
Brady, Robert J., Co.
Smith, Steve, Pictures

TROPHIES & PLAQUES
City Plaque Shop
National Trophy Sales, Inc.

WATER TANKS, PORTABLE CANVAS
American LaFrance Corp.
Darley, W. S., & Co.
Fol-Da-Tank Co.
Harodikes Incorporated
Hoosier Tarpaulin & Canvas Goods Co., Inc.
Pacific Marine Supply Co.

FIRE PREVENTION

FIRE RETARDANT MATERIALS

Paint, Etc.
Albi Chemical Co.

Safety Equipment for Flammable Liquids
American LaFrance Corp.
Darley, W. S., & Co.
National Foam System, Inc.
Protectoseal Company
Super Vacuum Mfg. Co., Inc.

FIRST AID EQUIPMENT

AMBULANCE COTS
Bomgardner Mfg. Co., The
Halprin Supply Co.
Medical Supply Co.
Mine Safety Appliances Co.
Superior Coach Corp.
Washington Products Co.

BURN TREATMENT
American LaFrance Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Lincoln Laboratories, Inc.
Medical Supply Co.
Mine Safety Appliances Co.

FIRST AID KITS
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Medical Supply Co.
Mine Safety Appliances Co.

PROTECTIVE BREATHING & REVIVING APPARATUS

Air Breathing Equipment
Acme Protection Equipment Co.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Cornelius Co., The (Air Compressors)
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Globe Industries Inc., Medical & Hospital Div.
Halprin Supply Co.
Mine Safety Appliances Co.
Scott Aviation Corp.
Stephenson Corporation
Young Fire Equipment Corporation

Aspirators
Bean, John, Div., Food Machinery & Chemical Corp.
Bomgardner Mfg. Co., The
Darley, W. S., & Co.
E & J Manufacturing Company
Emerson, J. H., Co.
Globe Industries Inc., Medical & Hospital Div.
Halprin Supply Co.
Midwest Oxygen Equipment Co.
Mine Safety Appliances Co.
Young Fire Equipment Corp.

Inhalators
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Bomgardner Mfg. Co., The
Darley, W. S., & Co.
E & J Manufacturing Company
Emerson, J. H., Co.
Globe Industries Inc., Medical & Hospital Div.
Halprin Supply Co.
Midwest Oxygen Equipment Co.
Mine Safety Appliances Co.
Scott Aviation Corp.
Stephenson Corporation
Young Fire Equipment Corp.

Masks
Acme Protection Equipment Co.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Bomgardner Mfg. Co., The
Cairns & Bro., Inc.
Darley, W. S., & Co.
E & J Manufacturing Company
Fyr-Fyter Co., The, Fyr-Fyter Div.
Globe Industries, Inc., Medical & Hospital Div.
Halprin Supply Co.
Midwest Oxygen Equipment Co.
Mine Safety Appliances Co.
Scott Aviation Corp.
Willson Products Div., Ray-O-Vac Co.
Young Fire Equipment Corp.

Oxygen Breathing Equipment
Acme Protection Equipment Co.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Bomgardner Mfg. Co., The
Darley, W. S., & Co.
E & J Manufacturing Company
Fyr-Fyter Co., The, Fyr-Fyter Div.
Globe Industries, Inc., Medical & Hospital Div.
Halprin Supply Co.
Mine Safety Appliances Co.
Stephenson Corporation
Young Fire Equipment Corp.

Respirators
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
E & J Manufacturing Company
Emerson, J. H., Co.
Halprin Supply Co.
Mine Safety Appliances Company
Scott Aviation Corp.
Willson Products Div., Ray-O-Vac Co.
Young Fire Equipment Corp.

Resuscitators
American LaFrance Corp.
Batrow Laboratories, Inc.
Bean, John, Div., Food Machinery & Chemical Corp.
Bomgardner Mfg. Co., The
Darley, W. S., & Co.
E & J Manufacturing Company
Emerson, J. H., Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Globe Industries, Inc., Medical & Hospital Div.
Halprin Supply Co.
Midwest Oxygen Equipment Co.
Mine Safety Appliances Co.
Stephenson Corporation
Young Fire Equipment Corp.

SPLINTS
Medical Supply Co.
Mine Safety Appliances Co.
Orthopedic Frame Co.

STRETCHERS
American LaFrance Corp.
Bomgardner Mfg. Co., The
Darley, W. S., & Co.
Medical Supply Co.
Mine Safety Appliances Co.
Safety Clothing & Equipment Co.
Washington Products Co.

HOSE, HOSE FITTINGS & HOSE STREAM APPLIANCES

HOSE, CHEMICAL & BOOSTER
American LaFrance Corp.
American Rubber Mfg. Co., The
Bean, John, Div., Food Machinery & Chemical Corp.
Bi-Lateral Fire Hose Co.
Boston Woven Hose & Rubber Co., Div. American Biltrite Rubber Co., Inc.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eureka Fire Hose Div., U. S. Rubber Co.
Fabric Fire Hose Co.
Fire Master Corporation
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Goodrich, B. F., Company, The
Halprin Supply Co.
Hamilton Rubber Mfg. Corp.
Hewitt-Robins, Inc.
Howe Fire Apparatus Co.
Pacific Marine Supply Co.
Quaker Rubber Div., H. K. Porter Co., Inc.
Republic Rubber Division, Lee Rubber & Tire Corp.
Snyder, M. L., & Son, Inc.
Thermoid Company
United States Rubber Co.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

HOSE COTTON, R. L.
American LaFrance Corp.
American Rubber Mfg. Co., The
Bean, John, Div., Food Machinery & Chemical Corp.
Boston Woven Hose & Rubber Co., Div. American Biltrite Rubber Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Goodrich, B. F., Co., The
Halprin Supply Co.
Hamilton Rubber Mfg. Corp.
Hewitt-Robins, Inc.
Howe Fire Apparatus Co.
Pacific Marine Supply Co.
Quaker Rubber Div., H. K. Porter Co., Inc.
Republic Rubber Div., Lee Rubber & Tire Corp.
Snyder, M. L., & Son, Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

HOSE FORESTRY
American Rubber Mfg. Co., The
Bi-Lateral Fire Hose Co.
Blaze Guard Mfg. Co.
Boston Woven Hose & Rubber Co., Div., American Biltrite Rubber Co., The
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eureka Fire Hose Div., U. S. Rubber Co.
Fabric Fire Hose Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Goodrich, B. F., Co., The
Halprin Supply Co.
Hamilton Rubber Mfg. Corp.
Hewitt-Robins, Inc.
Pacific Marine Supply Co.
Quaker Rubber Div., H. K. Porter Co., Inc.
Republic Rubber Division, Lee Rubber & Tire Corp.
Smith, D. B., & Co., Inc.
Snyder, M. L., & Son, Inc.
Ward LaFrance Truck Corporation
Young Fire Equipment Corp.

HOSE, HIGH PRESSURE
American LaFrance Corp.
American Rubber Mfg. Co., The
Bean, John, Div., Food Machinery & Chemical Corp.
Bi-Lateral Fire Hose Co.
Blaze Guard Mfg. Co.
Boston Woven Hose & Rubber Co., Div., American Biltrite Rubber Co., Inc.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eureka Fire Hose Div., U. S. Rubber Co.
Fabric Fire Hose Co.
Fire Master Corporation
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Goodrich, B. F., Company, The
Halprin Supply Co.
Hamilton Rubber Mfg. Co.
Hewitt-Robins, Inc.
Pacific Marine Supply Co.
Quaker Rubber Div., H. K. Porter Co., Inc.
Republic Rubber Division, Lee Rubber & Tire Corp.
Snyder, M. L., & Son, Inc.
Thermoid Company
United States Rubber Co.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

HOSE, RUBBER LINED
American LaFrance Corp.
American Rubber Mfg. Co., The
Bean, John, Div., Food Machinery & Chemical Corp.
Bi-Lateral Fire Hose Co.
Blaze Guard Mfg. Co.
Boston Woven Hose & Rubber Co., Div., American Biltrite Rubber Co., Inc.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eureka Fire Hose Div., U. S. Rubber Co.
Fabric Fire Hose Co.
Fire Master Corporation
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Goodrich, B. F., Company, The
Halprin Supply Co.
Hamilton Rubber Mfg. Corp.
Hewitt-Robins Inc.

(*Continued on next page*)

Hose, Rubber Lined *(Continued)*

Pacific Marine Supply Co.
Quaker Rubber Div., H. K. Porter Co., Inc.
Republic Rubber Division, Lee Rubber & Tire Corp.
Snyder, M. L., & Son, Inc.
United States Rubber Co.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

HOSE SUCTION

American LaFrance Corp.
American Rubber Mfg. Co., The
Bean, John, Div., Food Machinery & Chemical Corp.
Bi-Lateral Fire Hose Co.
Boston Woven Hose & Rubber Co., Div., American Biltrite Rubber Co., Inc.
Buffalo Fire Apparatus Corp.
Darley, W. S., & Co.
Eureka Fire Hose Div., U. S. Rubber Co.
Fabric Fire Hose Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Goodrich, B. F., Company, The
Halprin Supply Co.
Hamilton Rubber Mfg. Corp.
Hewitt-Robins Inc.
Pacific Marine Supply Co.
Quaker Rubber Div., H. K. Porter Co., Inc.
Republic Rubber Division, Lee Rubber & Tire Corp.
Snyder, M. L., & Son, Inc.
Thermoid Company
United States Rubber Co.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

HOSE APPLIANCES

Holders

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
H & H Fire Apparatus Corp.
Halprin Supply Co.
Snyder, M. L., & Son, Inc.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Hydrant Gates

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fry-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Mueller Co.
Powhatan Brass & Iron Works
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Increasers and Reducers

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The Fyr-Fyter Div.
H & H Fire Apparatus Corp.
Halprin Supply Co.
Howe Fire Apparatus Co.
McIntire, F. N., Brass Works, Inc.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Siamese and Y-fittings

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Siphons

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Snyder, M. L., & Son, Inc.

Suction Strainers

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bean, John, Div. Food Machinery & Chemical Corp.
Chiksan Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fol-Da-Tank Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Snyder, M. L., & Son, Inc.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Swivel Joints

Chiksan Co.

HOSE BRIDGES

American LaFrance Corp.
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
H & H Fire Apparatus Corp.
Halprin Supply Co.
Sharpsville Steel Fabricators, Inc.
Ward LaFrance Truck Corp.

HOSE CABINET UNITS

American Rubber Mfg. Co., The
Buffalo Fire Appliance Co.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Pacific Marine Supply Co.
Snyder, M. L., & Son, Inc.
Young Fire Equipment Corp.

HOSE CARTS, RACKS

American LaFrance Corp.
American Rubber Mfg. Co., The
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
H & H Fire Apparatus Corp.
Halprin Supply Co.
Maxim Motor Co.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Snyder, M. L., & Son, Inc.

HOSE CLAMPS

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Hewitt-Robins, Inc.
Hydra-Clamp Co.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Snyder, M. L., & Son, Inc.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

HOSE CLEANER

American LaFrance Corp.
Bi-Lateral Fire Hose Co.
Circul-Air Corp. (Washer)
Halprin Supply Co.
Martin, R & E

HOSE COUPLING EXPANDERS

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bell-Pihl Company
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

HOSE COUPLING EXPANSION RINGS

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Boston Woven Hose & Rubber Co., Div., American Biltrite Rubber Co., Inc.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Goodrich, B. F., Company, The
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

HOSE COUPLINGS, ADAPTERS, WRENCHES

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bar-Way Manufacturing Co. (Couplings, High Pressure)
Bean, John, Div., Food Machinery & Chemical Corp.
Boston Woven Hose & Rubber Co., Div., American Biltrite Rubber Co., Inc.
Buffalo Fire Appliance Corp.
Clayton, E. M., Co.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fabric Fire Hose Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Goodrich, B. F., Company, The
Halprin Supply Co.
Hamilton Rubber Mfg. Corp.
Hewitt-Robins, Inc.
McIntire, F. N., Brass Works, Inc.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Snyder, M. L., & Son, Inc.
Thermoid Company
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

HOSE DRYERS

American LaFrance Corp.
Approved Fire Equipment Co., Inc.
Circul-Air Corporation
Darley, W. S., & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Neep Equipment Co.
Young Fire Equipment Corp.

HOSE FIBRE, POLYESTER

American LaFrance Corp.
American Rubber Mfg. Co., The
Boston Woven Hose & Rubber Co., Div., American Biltrite Rubber Co., Inc.
Du Pont de Nemours, E. I. & Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodall Rubber Co.
Goodrich, B. F., Co., The

HOSE INCREASERS AND REDUCERS

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Snyder, M. L., & Son, Inc.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

HOSE JACKETS

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
American Rubber Mfg. Co., The
Boston Woven Hose & Rubber Co., Div., American Biltrite Rubber Co., Inc.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodrich, B. F., Co., The
Halprin Supply Co.
Hamilton Rubber Mfg. Co.
Hewitt-Robins, Inc.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Republic Rubber Div., Lee Rubber & Tire Corporation
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

HOSE REELS

American LaFrance Corp.
American Rubber Mfg. Co., The
Ardmore Products
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Hannay, Clifford B., & Son, Inc.
Oren Roanoke Corp.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Snyder, M. L., & Son, Inc.
Young Fire Equipment Corp.

HOSE STORAGE RACKS

American LaFrance Corp.
Circul-Air Corp.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Hannay, Clifford B., & Son, Inc.
Snyder, M. L., & Son, Inc.
W-B Manufacturing Co.
Young Fire Equipment Corp.

HOSE TURN TABLES

American LaFrance Corp.
Circul-Air Corp.
Halprin Supply Co.
Young Fire Equipment Corp.

HOSE WASHERS

Circul-Air Corp.

HYDRANT WRENCHES

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Mueller Co.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
S-T Hydrant Wrench Co.
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Waterous Co.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

HYDRANTS

Mueller Co.
Universal Fire Apparatus Corp.
Waterous Company
Wooster Brass Div., Fyr-Fyter Co., The

NOZZLES

Cellar Pipe

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Baker, J. M., Pattern Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Rockwood Sprinkler Company
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Deck Guns

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Baker, J. M., Pattern Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Chiksan Co.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Rockwood Sprinkler Co.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Deluge Sets

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Baker, J. M., Pattern Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Chiksan Co.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
National Foam System, Inc.
Rockwood Sprinkler Co.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Distributor

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Ansul Chemical Company
Baker, J. M., Pattern Co.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Foam

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
National Foam System, Inc.
Nicerol, Ltd.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Rockwood Sprinkler Company
Snyder, M. L., & Son, Inc.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Fog

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
American Rubber Mfg. Co., The
Baker, J. M., Pattern Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Myers, F. E., & Bro. Co.
McIntire, F. N., Brass Works, Inc.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Rockwood Sprinkler Co.
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Fog Foam

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Rockwood Sprinkler Company
Snyder, M. L., & Son, Inc.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Fog High Pressure

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Baker, J. M., Pattern Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Myers, F. E., & Bro., Co.
Pacific Marine Supply Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Rockwood Sprinkler Co.
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Young Fire Equipment Corp.

Master Stream

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Baker, J. M., Pattern Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Chiksan Co.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The

Partition

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Javelin Tool & Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Pipes, Ladder

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Baker, J. M., Pattern Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Seagrave Corp.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Pipes, Play

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Baker, J. M., Pattern Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Boston Woven Hose & Rubber Co., Div., American Biltrite Rubber Co., Inc.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Goodrich, B. F., Company, The
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
National Foam System, Inc.
Powhatan Brass & Iron Works
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Shut-Off

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
American Rubber Mfg. Co., The
Ansul Chemical Company
Baker, J. M., Pattern Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Pyrene-C-O-Two Div., Fyr-Fyter Co., The
Rockwood Sprinkler Company
Smith, D. B., & Co.
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

VALVES

Hose

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Grinnell Co., Inc.
Hale Fire Pump Co.
Halprin Supply Co.
McIntire, F. N., Brass Works, Inc.
Mueller Co.
Pacific Marine Supply Co.
Powhatan Brass & Iron Works
Rockwood Sprinkler Company
Snyder, M. L., & Son, Inc.
Waterous Company
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Hydrant-Gate

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Darley, W. S., & Co.
Eastman, Samuel, Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Keystone Valve Corp.
McIntire, F. N., Brass Works, Inc.
Mueller Co.
Powhatan Brass & Iron Works
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

(*Continued on next page*)

Relief

Bean, John, Div., Food Machinery & Chemical Corp.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Hale Fire Pump Co.
High Fog Pump Co.
Mueller Co.
Pacific Marine Supply Co.
Universal Fire Apparatus Corp.
Waterous Company
Wooster Brass Div., Fyr-Fyter Co., The

LIGHTING AND LIGHTING EQUIPMENT

BATTERIES, FLASHLIGHT

Bean, John, Div., Food Machinery & Chemical Corp.
Carpenter Manufacturing Co.
Halprin Supply Co.
Koehler Mfg. Co.
Mine Safety Appliances Co.
Pacific Marine Supply Co.
Ray-O-Vac Co.

BATTERY CHARGERS

Bean, John, Div., Food Machinery & Chemical Corp.
Carpenter Manufacturing Co.
Halprin Supply Co.
Katolight Corp.
Koehler Mfg. Co.
Notifier Corp.
Onan, D. W., & Sons, Inc.
Pioneer Gen-E-Motor Corp.
Young Fire Equipment Corp.

LIGHTS

Emergency (Automatic)

Carpenter Manufacturing Co.
U-C Lite Manufacturing Co.

Flares

Arguslite Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Halprin Supply Co.
McDermott, Julian A., Corp.
U-C Lite Manufacturing Co.

Floodlights

American LaFrance Corp.
Arguslite Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Halprin Supply Co.
Homelite Div., Textron Inc.
McDermott, Julian A., Corp.
Natale Machine & Tool Co.
Pacific Marine Supply Co.
Portable Light Co., Inc., The
Sireno Co., Inc., The
Young Fire Equipment Corp.

Hand Lamps

American LaFrance Corp.
Arguslite Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Carpenter Manufacturing Co.
Darley, W. S., & Co.
Fairbanks, Morse & Co.
Halprin Supply Co.
Koehler Manufacturing Co.
McDermott, Julian A., Corp.
Mine Safety Appliances Co.
Natale Machine & Tool Co.
Portable Light Co., Inc., The
Ray-O-Vac Co.
Sireno Co., Inc., The
U-C Lite Manufacturing Co.
Universal Fire Apparatus Corp.
Young Fire Equipment Corp.

Searchlights

American LaFrance Corp.
Arguslite Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Carpenter Manufacturing Co.
Darley, W. S., & Co.
Halprin Supply Co.
McDermott, Julian A., Corp.
Natale Machine & Tool Co.
Pacific Marine Supply Co.
Portable Light Co., Inc., The
Sireno Co., Inc., The
Universal Fire Apparatus Corp.
Young Fire Equipment Corp.

LIGHTING PLANTS, ELECTRIC

Portable

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Halprin Supply Co.
Homelite Div., Textron, Inc.
Katolight Corp.
Koehler Mfg. Co.
Kohler Co.
Onan, D. W., & Sons, Inc.
Pacific Marine Supply Co.
Pioneer Gen-E-Motor Corp.
Ward LaFrance Truck Corp.
Wincharger Corp.
Young Fire Equipment Corp.

Stationary

American LaFrance Corp.
Katolight Corp.
Kohler Co.
Onan, D. W., & Sons, Inc.
Pacific Marine Supply Co.
Pioneer Gen-E-Motor Corp.
Wincharger Corp.
Young Fire Equipment Corp.

PUMPS

PUMPS

Fire Apparatus

American LaFrance Corp.
American Fire Pump Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Fire Master Corporation
Four Wheel Drive Auto Co.
Gorman-Rupp Co.
Hale Fire Pump Co.
Halprin Supply Co.
Howe Fire Apparatus Co.
Oberdorfer Foundries, Inc.
Oren Roanoke Corp.
Pacific Marine Supply Co.
Pirsch, Peter, & Sons Co.
Potter-Horn Co.
Seagrave Corp.
Sharpsville Steel Fabricators, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Waterous Company
Young Fire Equipment Corp.

Hand Pumps

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Oberdorfer Foundries, Inc.
Parco Products Co.
Protectoseal Company (Drum)
Smith, D. B., & Co., Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

High Pressure

American LaFrance Corp.
American Fire Pump Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Fairbanks, Morse & Co.
Gorman-Rupp Co.
Hale Fire Pump Company
Halprin Supply Co.
High Fog Pump Company
Howe Fire Apparatus Co.
Marine Products Company
Myers, F. E., & Bro., Co.
Oren Roanoke Corp.
Pacific Marine Supply Co.
Seagrave Corporation
Sharpsville Steel Fabricators, Inc.
Underwriters Pump Co.
Ward LaFrance Truck Corp.
Waterous Company
Young Fire Equipment Corp.

Hydrant Dewatering

Akron Brass Mfg. Co., Inc.
Darley, W. S., & Co.
Fairbanks, Morse & Co.
Gorman-Rupp Co.
Halprin Supply Co.
Marine Products Company
Oberdorfer Foundries, Inc.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

Portable

American LaFrance Corp.
American Fire Pump Co.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Fairbanks, Morse & Co.
Gorman-Rupp Co.
Hale Fire Pump Co.
Halprin Supply Co.
Homelite Div., Textron, Inc.
Howe Fire Apparatus Co.
Marine Products Company
Marlow Pumps Div., Bell & Gossett Co.
Oberdorfer Foundries, Inc.
Oren Roanoke Corp.
Pacific Marine Supply Co.
Parco Products Co. (Knapsack)
Sharpsville Steel Fabricators, Inc.
Smith, D. B., & Co., Inc.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

Suction Boosters

American Fire Pump Co.
Darley, W. S., & Co.
Gorman-Rupp Co.
Marine Products Co.
Marlow Pumps Div., Bell & Gossett Co.
Oberdorfer Foundries, Inc.
Young Fire Equipment Corp.

Trailer Mounted

Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Fairbanks, Morse & Co.
Hale Fire Pump Co.
Halprin Supply Co.
Maxim Motor Co.
National Foam System, Inc.
Oberdorfer Foundries, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Waterous Company
Young Fire Equipment Corp.

TOOLS

AXES

American LaFrance Corp.
Atlas Safety Equipment Co., Inc. (Insulated)
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
Cairns & Bro., Inc.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fire Master Corporation
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Mann Edge Tool Company
Powhatan Brass & Iron Works
Snyder, M. L., & Son, Inc.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

CUTTERS, BAR, CHAIN, WIRE

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Key-Hak Div., Producers & Distributors, Inc.
Porter, H. K., Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

CUTTING & WELDING EQUIPMENT

American LaFrance Corp.
Darley, W. S., & Co.
Halprin Supply Co.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

FORCIBLE ENTRY TOOLS

Akron Brass Mfg. Co., Inc.
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Blackhawk Mfg. Co.
C.-D. Pike & Fire Hook Mfg. Corp.
Darley, W. S., & Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Key-Hak Div., Producers & Distributors, Inc.
Milwaukee Electric Tool Corp.
Pirsch, Peter, & Sons, Co.
Porter, H. K., Co.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

HOOK & PIKE POLES

Akron Brass Mfg. Co., Inc.
Aluminum Ladder Company
American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Buffalo Fire Appliance Corp.
C-D Pike & Fire Hook Mfg. Co.
Darley, W. S., & Co.
Duo-Safety Ladder Corp.

Fire Master Corporation
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Pacific Marine Supply Co.
Pirsch, Peter, & Sons, Co.
Universal Fire Apparatus Corp.
Ward LaFrance Truck Corp.
Wooster Brass Div., Fyr-Fyter Co., The
Young Fire Equipment Corp.

HOT LINE HANDLING TOOLS

Orchard Industries, Inc.

JACKS (Hydraulic)

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Blackhawk Mfg. Co.
Halprin Supply Co.
Porter, H. K., Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

POWER PLANTS, ELECTRIC

Portable

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Cairns & Bro., Inc.
Carpenter Manufacturing Co.
Darley, W. S., & Co.
Detroit Diesel Engine Div., General Motors Corp.
Fairbanks, Morse & Co.
Fyr-Fyter Co., The, Fyr-Fyter Div.
Halprin Supply Co.
Homelite Div., Textron, Inc.
Katolight Corp.
Kohler Co.
Onan, D. W., & Sons, Inc.
Pacific Marine Supply Co.
Pioneer Gen-E-Motor Corp.
Ward LaFrance International, Inc.
Ward LaFrance Truck Corp.
Wincharger Corp.
Winpower Mfg. Co.
Young Fire Equipment Corp.

Stationary

American LaFrance Corp.
Detroit Diesel Engine Div., General Motors Corp.
Halprin Supply Co.
Katolight Corp.
Kohler Co.
Onan, D. W., & Sons, Inc.
Pacific Marine Supply Co.
Pioneer Gen-E-Motor Corp.
Ward LaFrance International, Inc.
Ward LaFrance Truck Corp.
Wincharger Corp.
Winpower Mfg. Co.
Young Fire Equipment Corp.

POWER TOOLS

American LaFrance Corp.
Bean, John, Div., Food Machinery & Chemical Corp.
Blackhawk Mfg. Co.
Halprin Supply Co.
Key-Hak Div., Producers & Distributors, Inc.
Milwaukee Electric Tool Corp.
Pacific Marine Supply Co.
Porter, H. K., Inc.
Ward LaFrance Truck Corp.
Young Fire Equipment Corp.

RESCUE TOOLS, HYDRAULIC

Blackhawk Mfg. Co.
Porter, H. K., Inc.

SAWS, CHAIN

Bean, John, Div., Food Machinery & Chemical Corp.
Halprin Supply Co.
Homelite Div., Textron, Inc.
Pacific Marine Supply Co.
Ward LaFrance Truck Corp.

DIRECTORY OF MANUFACTURERS

Listed in WHERE TO BUY SECTION

For Advertisers in this issue see Advertising Index on page 902

A & W Specialty Co., 3717 Midland Ave., Syracuse 7, N. Y.
Acme Protection Equipment Co., 1215 Kalamazoo St., South Haven, Mich.
Akron Brass Mfg. Co., Inc., 1500 Spruce St., Wooster, Ohio
Albi Chemical Co., Rockville, Conn.
Aluminum Ladder Co., Worthington, Pa.
American District Telegraph Co., 155 Sixth Ave., New York 13, N. Y.
American Fire Apparatus Co., Box 1024, Battle Creek, Mich.
American Fire Pump Co., Capital Ave., Battle Creek, Mich.
American LaFrance Corp., 100 E. LaFrance St., Elmira, N. Y.
American Rubber Mfg. Co., 1145 Park Ave., Oakland 8, Cal.
Ansul Chemical Co., 1 Stanton St., Marinette, Wis.
Approved Fire Equipment Co., Inc., Austin & Audubon Blvds., Island Park, L. I., N. Y.
Aquatic Equipment Co., Box 563, Des Moines, Iowa
Ardmore Products, 1825 Sherman Rd., Northbrook, Ill.
Arguslite Co., Blue Ridge Summit, Pa.
Atlas Safety Equipment Co., Inc., 27 Warren St., New York 7, N. Y.
Audio Equipment Co., Inc., 805 Middleneck Rd., Great Neck, L. I., N. Y.

Baker, J. M., Pattern Co., Sprague St., Providence, R. I.
Bar-Way Mfg. Co., 60 Canal St., Stamford, Conn.
Batrow Laboratories, Inc., Branford, Conn.
Bean, John, Div., Food Machinery and Chemical Corp., 1305 S. Cedar St., Lansing 4, Mich.
Bell-Pihl Co., 17 Wyman St., Arlington 74, Mass.
Bendix Radio Div., Bendix Aviation Corp., Baltimore 4, Md.
Bi-Lateral Fire Hose Co., 20 N. Wacker Dr., Chicago, Ill.
Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 46, Wis.
Blackinton, V. H., & Co., Inc., Attleboro Falls, Mass.
Blaze Guard Mfg. Co., North Bergen, N. J.
Boardman Co., Fire Apparatus Div., 1401 S. W. 11th St., Oklahoma City, Okla.
Body-Guard Mfg. Co., 222 S. Fourth St., St. Joseph, Mo.
Bomgardner Mfg. Co., The, 1384 Hird Ave., Cleveland 7, Ohio
Boston Woven Hose & Rubber Co., Div. American Biltrite Rubber Co., Inc., P. O. Box 1071, Boston 3, Mass.
Brady, Robert J., Co., 3255 M St., N. W., Washington 7, D. C.
Braxmar, C. G., Co., Inc., 216 E. 45th St., New York 17, N. Y.
Brooks, Earl A., U. S. Route 30 (next to Airport), Coatesville, Pa.
Buffalo Fire Appliance Corp., 221 Crane St., Dayton 1, Ohio

Cairns & Bro., Inc., 854 Bloomfield Ave., Allwood, Clifton, N. J.
Carpenter Mfg. Co., Master Light Building, Somerville 45, Mass.
C-D Pike & Fire Hook Mfg. Corp., 207 Orange St., New Haven 10, Conn.
Central Fire Truck Corp., Manchester, Mo.
Champion Sprayer Co., 6533 Heintz Ave., Detroit 11, Mich.
Chiksan Co., P. O. Box 158, Brea, Cal.
Christopher Co., The, 66-70 Beaver St., New York 4, N. Y.
Circul-Air Corp., 575 E. Milwaukee Ave., Detroit 2, Mich.
City Plaque Shop, Box 6, Eastwood Station, Syracuse 6, N. Y.
Clayton, E. M., Co., 228-236 Cherry St., Philadelphia, Pa.
Continental Motors Corp., 205 Market St., Muskegon, Mich.
Cornelius Company, The, 350—39th Ave., N. E., Minneapolis 21, Minn.

Dakota Chemical Co., 213 W. Tenth St., Sioux Falls, S. Dak.
Darley, W. S., & Co., 2810 Washington Blvd., Chicago 12, Ill.
Delco-Remy Div., General Motors Corp., 2401 Columbus Ave., Anderson, Ind.
Detroit Diesel Engine Div., General Motors Corp., 13400 W. Outer Dr., Detroit 28, Mich.
Dexter Folder Co., Filmsort Div., Pearl River, N. Y.
Deynor Corp., 1 Depot Plaza, Mamaroneck, N. Y.
Dictaphone Corporation, 420 Lexington Ave., New York 17, N. Y.
Du Mont, Allen B., Laboratories, Inc., 760 Bloomfield Ave., Clifton, N. J.
Duo-Safety Ladder Corp., 811 9th St., Oshkosh 1, Wis.
Du Pont de Nemours, E. I., & Co., Inc., Textile Fibers Dept., Wilmington 98, Del.

E & J Mfg. Co., 100 E. Graham Place, Burbank, Cal.
Eagle Signal Corp., Municipal Div., 202 - 20th St., Moline, Ill.
Eastman, Samuel, Co., Inc., 25 Carpenter St., Concord, N. H.
Electronic Engineering Enterprises, 116 W. Indian School Rd., Scottsdale, Ariz.
Electronic Protection, Inc., sub., Standard Coil Products Co., Inc., 2085 N. Hawthorne Ave., Melrose Park, Ill.
Elkhart Brass Mfg. Co., Inc., 1302 W. Beardsley Ave., Elkhart, Ind.
Emerson, J. H., Co., 22 Cottage Park Ave., Cambridge 40, Mass.
Eureka Fire Hose Div., U. S. Rubber Co., 1 Market St., Passaic, N. J.
Everson-Ross Co., Inc., 88 Chambers St., New York 7, N. Y.

Fabric Fire Hose Co., Sandy Hook, Conn.
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.
Falcon Alarm Co., Inc., 243 Broad St., Summit, N. J.
Federal Sign & Signal Corp., 8702 S. State St., Chicago 19, Ill.
Fire Master Corp., 36100 Harper St., Mt. Clemens, Mich.

Foard, F. C., & Co., P. O. Box 481, Bridgeport, Conn.
Fol-Da-Tank Co., Box 361, Rock Island, Ill.
Ford Motor Co., P. O. Box 658, Dearborn, Mich.
Four Wheel Drive Auto Co., Clintonville, Wis.
Fulton Bag & Cotton Mills, P. O. Box 1726, Atlanta, Ga.
Fyr-Fyter Co., The, Fyr-Fyter Div., 221 Crane St., Dayton 1, Ohio
Fyrpel Products, Inc., P. O. Box 503, Newark, Ohio

Gamewell Co., Newton Upper Falls, Mass.
Garrison Mfg. Co., Inc., 4609 E. Shiela St., Los Angeles 23, Cal.
General Air Products Corp., 5343 N. Kedzie Ave., Chicago 25, Ill.
General Electric Communication Products Dept., Electronics Park, Syracuse, N. Y.
Globe Industries, Inc., Medical & Hospital Div., 123 Sunrise Pl., Dayton 7, Ohio
Globe Manufacturing Co., Pittsfield, N. H.
Gold Crest Safety Equipment Corp., P. O. Box 155, Highway 22, Dunellen, N. J.
Goodall Rubber Co., Whitehead Rd., Trenton 4, N. J.
Goodrich, B. F., Company, 500 S. Main St., Akron 18, Ohio
Gorman-Rupp Co., 305 Bowman St., Mansfield, Ohio
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H & H Fire Apparatus Corp., 725 Tonnele Ave., Jersey City 7, N. J.
Hale Fire Pump Co., Conshohocken, Pa.
Hall-Scott, Inc., 2850-7th St., Berkeley 10, Cal.
Halprin Supply Co., 1355 S. Flower St., Los Angeles 15, Cal.
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Hannay, Clifford B., & Son, Inc., Westerlo, N. Y.
Harodikes, Inc., North Dighton, Mass.
Harron Labs., 42-10 220th St., Bayside 61, N. Y.
Hewitt-Robins, Inc., 666 Glenbrook Rd., Stamford, Conn.
High Fog Pump Co., 225 Rosemead Blvd., Pasadena, Cal.
Homelite Div., Textron, Inc., 308 Riverdale Ave., Port Chester, N. Y.
Hoosier Tarpaulin & Canvas Goods Co., Inc., 1302-10 W. Washington St., Indianapolis 6, Ind.
Howe Fire Apparatus Co., 1402 W. 22nd St., Anderson, Ind.
Hydra-Clamp Co., 291 Bartlett St., Manchester, N. H.

Industrial Radio Corp., 428 N. Parkside Ave., Chicago 44, Ill.
International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

Janesville Apparel Co., 216 N. Franklin St., Janesville, Wis.
Javelin Tool & Supply Co., Erie, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Johnson Motors, 6200 Pershing Rd., Waukegan, Ill.

Katolight Corp., Box 891-99 Mankato, Minn.
Key-Hak Div., Producers & Distributors, Inc., 1321 Hanover Ave., Allentown, Pa.
Keystone Valve Corp., 5325 Kirby Dr., Houston 5, Texas
Kidde, Walter, & Co., Inc., 194 Main St., Belleville 9, N. J.
Koehler Mfg. Co., 395 Lincoln St., Marlboro, Mass.
Kohler Co., Kohler, Wis.

Lane, E. B., 32 Greenwood Ave., Toledo 5, Ohio
Leece-Neville Co., 1374 E. 51st St., Cleveland 3, Ohio
Lincoln Laboratories, Inc., P. O. Box 1139, Decatur, Ill.

McDermott, Julian A., Corp., 1639 Stephen St., Ridgewood 27, L. I., N. Y.
McIntire, F. N., Brass Works, Inc., 377 Putnam Ave., Cambridge 39, Mass.

Macchi & Co., 819 Valencia St., San Francisco 16, Cal.
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Marlow Pumps, Div. Bell & Gossett Co., Box 200, Midland Park, N. J.
Mars Signal Light Co., 4322 W. Chicago Ave., Chicago 51, Ill.
Martin, R. & E., 2817-21 Helen St., Philadelphia 34, Pa.
Mason-Worcester Brush Co., Worcester Brush & Scraper Co., Div., 38 Austin St., Worcester 1, Mass.
Maxim Motor Co., 170 Wareham St., Middleboro, Mass.
Medical Supply Co., 1027 W. State, Rockford, Ill.
Memco Aerial Ladder Co., 1007 N. W. 36th St., Oklahoma City 18, Okla.
Midwest Oxygen Equipment Corp., 1664 W. Ogden Ave., Chicago 12, Ill.
Midwestern Safety Mfg. Co., Mackinaw, Ill.
Miller-Meteor Motor Car Div., Divco-Wayne Corp., S. Elm St., Bellefontaine, Ohio
Milwaukee Electric Tool Corp., 5368 W. State St., Milwaukee 8, Wis.
Mine Safety Appliances Co., 201 North Braddock Ave., Pittsburgh 8, Pa.
Monitoradio Div., I. D. E. A., Inc., 7900 Pendleton Pike, Indianapolis 26, Ind.
Morning Pride Co., 1986 Home Ave., Dayton 3, Ohio
Motorola, Communications & Electronics, Inc., 4501 West Augusta Blvd., Chicago 51, Ill.
Mountain States Equipment Co., 1238 Speer Blvd., Denver 4, Colo.
Mueller Co., 512 West Cerro Gordo St., Decatur, Ill.
Myers, F. E., & Bro., Co., Fourth & Orange Sts., Ashland, Ohio

Natale Machine and Tool Co., 339 State Highway No. 17, Carlstadt, N. J.
National Foam System, Inc., Union and Adams Sts., West Chester, Pa.
National Trophy Sales, Inc., 75 W. Van Buren St., Chicago 4, Ill.
Naval Co., Old Easton Highway, Doylestown, Pa.
Neep Equipment Co., The, 326 N. W. Broadway, Portland, Ore.
Nicerol Limited, Geo. T. Reynolds, U. S. Repr., P. O. Box 395, Thornwood, N. Y.
Nielsen-Rionda, Inc., 40 John St., New York 38, N. Y.
Notifier Corp., 239 S. 11th St., Lincoln 8, Nebr.

Oberdorfer Foundries, Inc., Thompson Rd., Syracuse 1, N. Y.
Onan, D. W., & Sons, Inc., 3127 University Ave., S. E., Minneapolis 14, Minn.
Orchard Industries Inc., 701 W. State St., Hastings, Mich.
Oren Roanoke Corp., 1201-09 W. Salem Ave., Roanoke 2, Va.
Orthopedic Frame Co., 420 Alcott St., Kalamazoo, Mich.

Pacific Marine Supply Co., 1223 Western Ave., Seattle 1, Wash.
Pacific Reflex Signs, Box 323, McMinnville, Ore.
Parco Products Co., Pennsburgh, Pa.
Perfex, 41 Dinsmore Pl., Brooklyn 8, N. Y.
Phon Alarm Div., Angelus Industries, 11300 Hindry Ave., Los Angeles 45, Cal.
Pioneer Gen-E-Motor Corp., 5841 W. Dickens Ave., Chicago 39, Ill.
Pirsch, Peter, & Sons Co., 1308 35th St., Kenosha, Wis.
Plectron Corp., P. O. Box 7, Overton, Neb.
Portable Light Co., Inc., 216 William St., New York 38, N. Y.
Porter, H. K., Inc., 74 Foley St., Somerville 43, Mass.
Potter Engineering Co., Milroy, Pa.
Potter-Horn Co., Statler Bldg., Boston 16, Mass.
Power Equipment Co., 6000 Paseo St., Kansas City 10, Mo.
Powhatan Brass & Iron Works, Ranson, W. Va.
Protectoseal Co., 1920 S. Western Ave., Chicago 8, Ill.
Pye Corp. of America, 1149 Raritan Ave., Highland Park, N. J.
Pyrene—C-O-Two, Div., Fyr-Fyter Co., The, U. S. Highway 1, Newark 1, N. J.
Pyrotronics, Div., Baker Industries, Inc., 10 Empire St., Newark 12, N. J.

Quaker Rubber Div., H. K. Porter Co., Inc., Conly and Tacony Sts., Philadelphia 24, Pa.

Ray-O-Vac Co., 212 E. Washington Ave., Madison 10, Wis.
Red Comet, Inc., Red Comet Bldg., Littleton, Colo.
Reese, S. H., 57 Warren St., New York 7, N. Y.
Republic Rubber Div., Lee Rubber & Tire Corp., 1410 Albert St., Youngstown 1, Ohio
Rockwood Sprinkler Co., 38 Harlow St., Worcester 5, Mass.
Russell Uniform Co., 192 Lexington Ave., New York 16, N. Y.

Safa Alarm Div., Inc., Fyr-Fyter Co., The, P. O. Box 1118, Newark 1, N. J.
Safety Clothing & Equipment Co., 1990 E. 69th St., Cleveland 3, Ohio
Safety First Products Corp., 175 Saw Mill River Rd., Elmsford, N. Y.
Sawyer, H. M., & Son, Div., Sawyer-Tower Inc., Watertown 72, Mass.
Scott Aviation Corp., 207 Erie St., Lancaster, N. Y.
Seagrave Corp., 2000 S. High St., Columbus 7, Ohio
Sharpsville Steel Fabricators, Inc., 6th & Main Sts., Sharpsville, Pa.
Sireno Co., Inc., 214 William St., New York 38, N. Y.
Smith, D. B., & Co., Inc., 414 Main St., Utica 2, N. Y.
Smith, Steve, Pictures, Route 6, Topeka, Kans.
Snyder, M. L., & Son, Inc., 2417 N. Jasper St., Philadelphia 25, Pa.
S-T Hydrant Wrench Co., P. O. Box 921, Holyoke, Mass.
Stephenson Corp., Box 392, Red Bank, N. J.
Sterling Siren Fire Alarm Co., Inc., 8 Bartlett St., Rochester 8, N. Y.
Sullivan, H. A., Co., Lawrence, L. I., N. Y.
Superior Coach Corp., E. Kibby St., Lima, Ohio
Superior Signal Co., Inc., 6 Colfax St., South River, N. J.
Super Vacuum Manufacturing Co., Inc., 319½ E. 17th Ave., Denver 3, Colo.

Thermoid Company, Whitehand Rd., Trenton 6, N. J.
Trippe Manufacturing Co., 133 N. Jefferson St., Chicago 6, Ill.

U-C Lite Mfg. Co., 1050 W. Hubbard St., Chicago 22, Ill.
Underwriter Pump Co., 1915 S. San Pedro St., Los Angeles, Cal.
United States Rubber Co., 1230 Ave. of the Americas, New York 20, N. Y.
Universal Fire Apparatus Corp., P. O. Box 187, Logansport, Ind.
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Valley Fire Truck Co., 59 Tuscola Rd., Bay City, Mich.

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Ward LaFrance Truck Corp., Grand Central Ave., Elmira Heights, N. Y.
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Waukesha Motor Co., West St. Paul Ave., Waukesha, Wis.
W-B Manufacturing Co., 157 No. Wasco St., Wichita, Kans.
Wentworth-Forman Co., Inc., 21 Edinboro St., Boston 11, Mass.
Whelen Engineering Co., Deep River, Conn.
Willson Products Div., Ray-O-Vac Co., 212 E. Washington Ave., Madison 10, Wis.
Wincharger Corp., E. 7th & Division St., Sioux City, Iowa
Winpower Mfg. Co., Newton, Iowa
Wooster Brass Div., Fyr-Fyter Co., The, 1415 E. Bowman St., Wooster, Ohio

Young Fire Equipment Corp., 1546 William St., Buffalo 6, N. Y.

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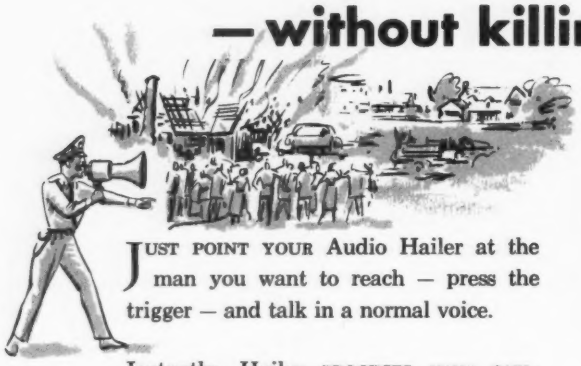

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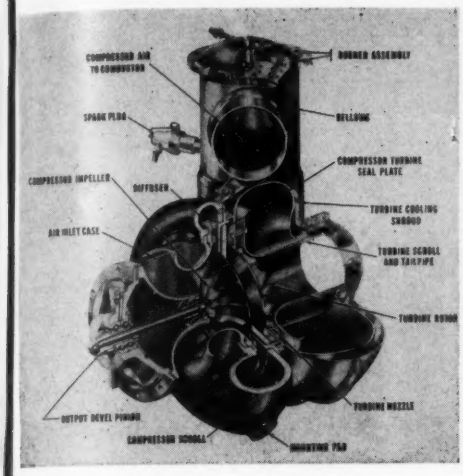


Left: Cutaway view of Solar Mars gas turbine assembly. **Right:** Oil-fed fire is extinguished by armed forces trainees using late type jet turbine portable pump—*Photos courtesy Solar Aircraft Company*

The Gas Turbine for Fire Fighting

THE GAS TURBINE has come through its awkward age with remarkable speed. Today it is an accepted power plant with commercial airlines and with the military—and its inherent advantages are gaining wide recognition in many new commercial fields. It is moving out of the areas of specialized military and aircraft use and into the workaday world of industrial production and power.

The simplicity, portability and compactness of gas turbine fire fighting pumps make them ideally suited for forestry and civil defense jobs calling for quick, positive action. They are especially effective in this area—where fuel economy and initial cost are secondary to performance and reliability. Pumps for use by fire departments must meet stern requirements for delivering a sizable volume of water at good working pressures. Until now, most equipment for use in major fire fighting has been limited to pumps permanently mounted on a wheeled chassis. Augmentation of standard apparatus by reaching inaccessible water sources, particularly in fighting forest fires, is usually limited to short line operation. This is largely due to small pump capacity in relationship to portability.

Useful for forest fires

Inasmuch as the gas turbine pump can be used as a relay pump as well as a direct pump from inaccessible water sources, it is particularly well suited to fighting forest fires and for other emergency uses requiring light weight and portability. The use of helicopters in fire fighting has made the compact turbine pump even more attractive as a piece of portable equipment which can be strategically located in mountain areas.

The gas turbine power plant

Because the gas turbine is usually associated with modern jet aircraft, it is often thought of as a recent development. Actually, the principle of the gas turbine was used 2,000 years ago by Hero Alexandrinus in his famous "Hero's Wheel." The gas turbine is different from the steam turbine in two respects: the gas has been changed from steam to air and the feedwater pump and boiler for making steam at high pressure and temperature has been replaced by a compressor and combustion chamber. Because the gas turbine's compressor is driven by its turbine, the gas turbine becomes a completely integrated power plant, whereas the steam turbine depends upon a heat source separate from the turbine.

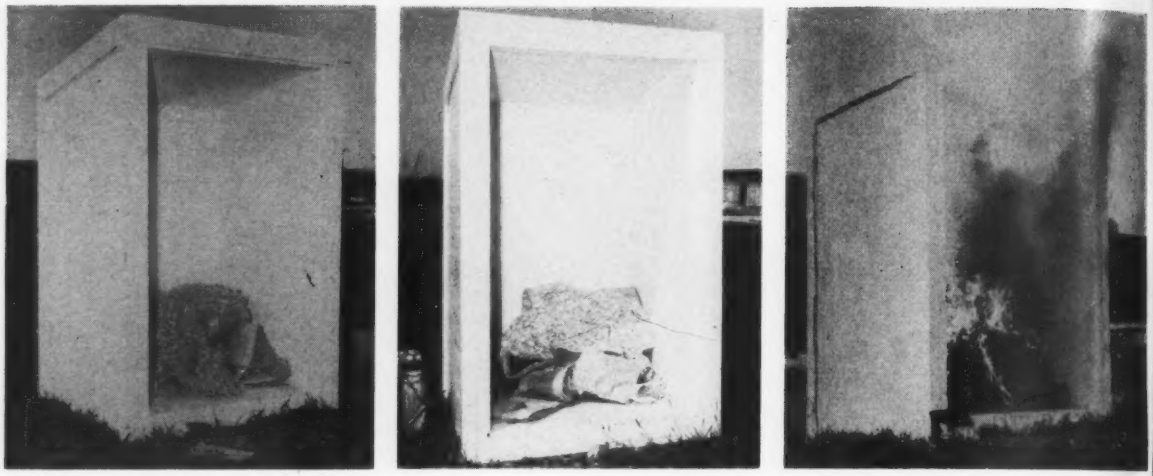
In a gas turbine—the simplest of all heat engines—ambient air enters the compressor, is compressed, then enters the combustion chamber where fuel is added and burned in the air stream. At the exit of the combustion chamber the gas has the same potential energy as steam coming from a boiler. About two-thirds of the energy is extracted for driving the compressor and the remaining one-third is available for driving rotating equipment, such as a pump or generator.

Until about eight or ten years ago gas turbines—used almost exclusively for aircraft propulsion and for driving large machinery—were too large for portable fire pumps. Through the experience gained in using large gas turbines, however, it became increasingly evident that small gas turbines could be used to advantage in applications formerly considered beyond their scope. Small gas turbines have a weight-to-power ratio considerably lower than comparable reciprocating engines. They can be operated at low cost and on less flammable diesel fuel, and they have reliable starting characteristics at low ambient temperatures. There are fewer parts in a gas turbine than in a reciprocating engine; maintenance is correspondingly simple.

The turbine-driven fire pump

The inherent advantages of gas turbine power led the Navy Bureau of Ships to consider gas turbines as a power source for 500 gpm portable fire pumps, to replace shipboard pumps driven by four-cylinder, two-cycle gasoline engines. By 1948 the intensive development and subsequent improvement in gas turbine design, and the widespread service experience gained in aircraft applications, indicated that an acceptable operating life could be expected from the small gas turbine under consideration. Consequently, competitive proposals were requested by the Navy, and contracts were awarded by the Bureau of Ships for prototype test units. One of these contracts was awarded to Solar Aircraft Company, San Diego, California, which designed and produced a power plant identified as the Solar Model T-45 and later called the Solar Mars. The contract under which the unit was produced required that the prime mover be designed to drive a centrifugal water pump with a sea water rating of 500 gpm at 100 psi discharge pressure

Continued on page 875



Left: Test structure painted with two coats of fire-retardant paint. **Center:** Test structure painted with two coats of regular oil paint. Both structures contained the same fuel—excelsior and wood shavings primed with one gallon of gasoline. **Right:** Test fire in protected structure after four minutes

No longer orphans, overlooked and underrated

FIRE-RETARDANT PAINTS

have become proven tools of the fire protectionist

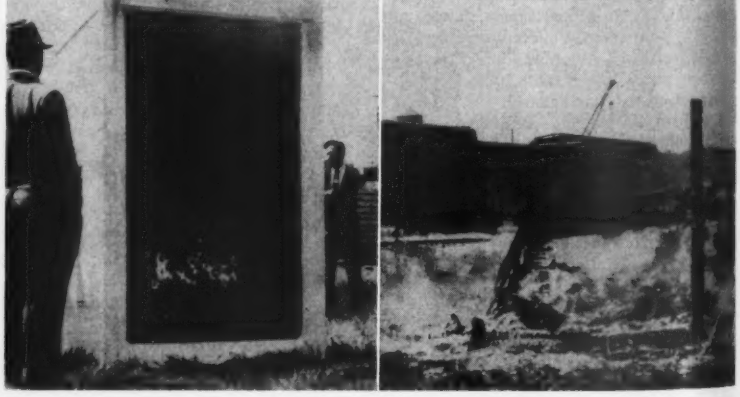
By GERALD E. MISNER

Fire Protection Engineer, Albi Manufacturing Co.

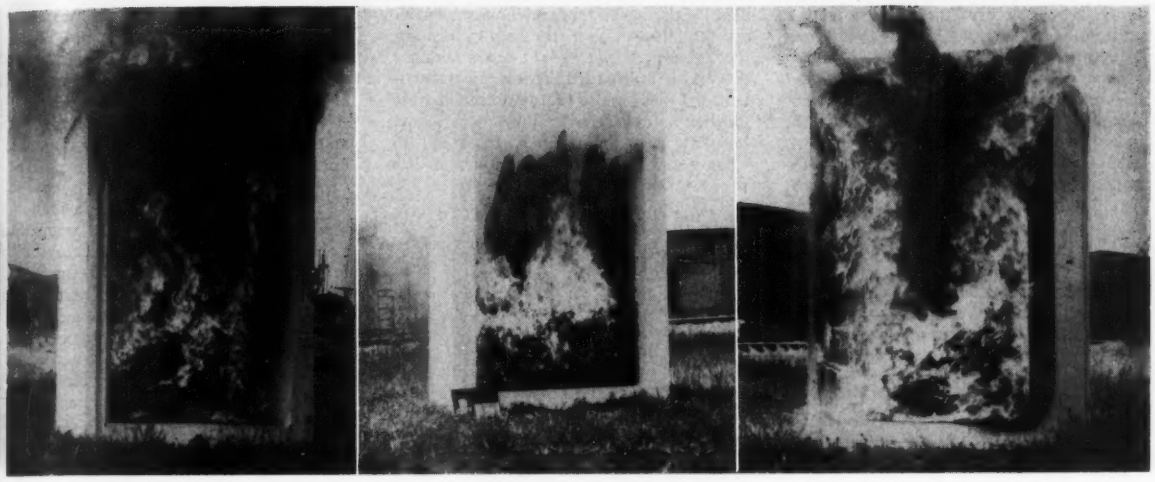
IN THE DAYS of the Pharaohs the Egyptians used to dip dry marsh grasses in salty sea water before building thatched roofs, for even 3,000 years ago, man had learned that salt-treated bulrushes would resist falling sparks and burning embers. Thus history has, perhaps, recorded one of the first forms of fire prevention and the ancestor of modern fire-retardant paints and solutions. Along about the time of Columbus, color was added through the introduction of whitewash, as the builders of the 15th Century recognized that here was a product which would not burn with the ferocity developed by colored oils and other early paint products used for decoration and surface protection of combustible wood surfaces.

However, there was very little improvement in fire prevention for the next 500 years. Then those great all-consuming fires in London, Paris, Constantinople, New York, Chicago, Boston and Baltimore ultimately brought about the study of these tragic holocausts which had killed so many and ruined so many more. But again, very little definite action was taken until soon after the San Francisco fire of 1906, the worst conflagration in American history, when public indignation forced politicians and public officials to accept recommendations growing out of fire prevention studies and to actually convert at least part of them into law. Why does man seem to prefer to learn the hard and expensive way?

During the McKinley and Roosevelt administrations the improvement of fire protection methods and equipment was



Test fire after 14 minutes—(left) fire dying out in fire-retardant protected structure, showing little evidence of damage; (right) same fire showing complete destruction of building protected with conventional non-retardant oil paint



Left: Oil painted booth after fire of four minutes duration. **Center and right:** Test structures after six-minute period

encouraged; fire-retardant solutions being used for the first time for protection of stage curtains and draperies, also in reducing the flamespread on combustible wood surfaces.

Applications limited

But regrettably, the number of applications was very limited. For example, had the muslin curtains at the Iroquois Theater in Chicago been properly flameproofed during Christmas week of 1903, many of those 603 men, women and children who perished so horribly might still be living today. True, the tragedy did ultimately bring about certain fire safety measures, but this lesson and those of many other disasters through the following years to and including the Boston Cocoanut Grove, and the Ringling Brothers Circus fire in Hartford, to mention only two of many, were not sufficient or lasting.

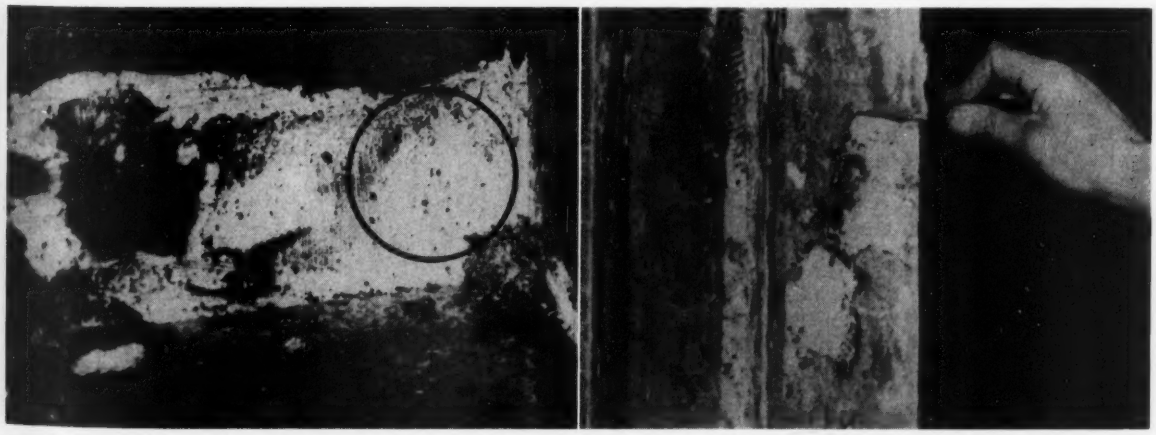
Here again, proper prevention and the approved application of effective flameproofing solutions would have saved all or most of the 656 lives sacrificed to ignorance—or worse, in just those two tragic fires. The fact that many of those persons responsible for these fires paid large fines or went to jail, did little to encourage passage of laws to stop this senseless killing. It took an aroused public to bring about such corrective measures as finally eventuated.

The development of fire-retardant paints received extra impetus during the first years of World War II, especially from the Navy and other federal departments. Perhaps this was largely due to the fact that the reported losses to capital ships as a result of fire was much greater than the losses from high explosives, bombs, shells or torpedoes combined. Supposedly "fireproof" ships supported destructive fires, hour after hour. Water-tight, all steel bulkheads permitted the transfer of heat without the passage of any live flame, so that fire damage and destruction spread from bow to stern.

Navy short of goal

As part of its fire prevention program the Navy and its scientists developed a fire-resistant product known as 24-C-20, later "improved" to JAN-P-702. These two products in themselves would not burn nor spread fire, but neither would they protect the surfaces over which they were applied. When applied over steel in one two or three coats these Federal formulations would still permit the transfer of heat, with the complete loss of steel's temper and load-carrying capacity in any fire where the temperature attained 1,100 degrees or more; also when these products were applied over wood or fibreboard the walls or partitions would still burn to complete destruction.

Perhaps even more serious is the fact that these products were and are also being used for the "protection" of barracks where officers and men are quartered; likewise, as paint products for other valuable shore installations constructed of wood, fibreboard, plywood and other combustible materials. Just this year 40 officers in a wood frame BOQ barely escaped with their lives at Long Beach, Calif., when aroused by a brave Navy nurse who just chanced to notice the telltale wisps of smoke at three in the morning. Inquiry showed that this BOQ had been painted with the latest Federal Spec Fire-Resistant Paint TT-P-26, and it was a total loss in 15 minutes. This and many



Left: Post-fire examination shows the intumescent insulation (blackened area) scraped away; retardant protection (circled) still present. No structural damage was done to test building. **Right:** Actual scene of protected surface after a fire. Scraping away intumescence shows no charring of wood or destruction of timber

similar examples are in the records extending even up to the all important DEW line.

Recognizing this seeming shortsightedness in the part of certain agencies and bureaus, private industry has gone ahead on its own initiative in actually developing and producing something really worth while in the field of fire retardants, products which will effectively resist fire, flamespread and fuel contribution, and likewise, prevent heat transfer under the exacting tests of the Underwriters' Laboratories, Factory Mutual Laboratories, Bureau of Standards and other nationally recognized testing and approving authorities. During the last 10 years tremendous strides have been made in the formulation of UL listed fire-retardant paints for the protection of combustible wood surfaces, fibreboard, plywood, acoustical tile and other combustible materials.

Single coat reduces flamespread

Under the exacting standards and procedures of the UL Tunnel test the flamespread of most raw wood surfaces is rated between 100 and 120, while the flamespread of asbestos cement board is rated at 0 (zero), thus providing an excellent basis of comparison. Today we have UL listed fire-retardant paints which in just a single coat applied at 200-250 square feet per gallon will reduce the flamespread on combustible wood surfaces down to 35-45, thus eliminating between 55 per cent and 65 per cent of the potential flamespread hazard. The UL also lists a fire-retardant paint which in just two brush or spray coats (applied at 200 square feet per gallon) will reduce the flamespread on Douglas Fir down to 20-25 or as "incombustible" under many of the accepted flamespread standards. This is a remarkable and outstanding degree of effectiveness and performance under very severe fire conditions and can mean the difference between an insignificant amount of fire damage as against a total fire loss or even a loss of one or more lives.

In 1945 the first fire-retardant or fire-resistant paint was tested and listed by the Underwriters' Laboratories. Since that time many products have been submitted to the Labs but only a comparatively few have successfully passed even the minimum standard of performance covering flamespread, fuel contribution and smoke density. While some manufacturers, inventors and purchasing agents may have been most critical of the UL, the fact remains that the Labs integrity, care, caution, procedures and experiences are your protection and assurance of obtaining the best performance, formulation and manufacture year after year, whether you are purchasing fire-retardant paint, fire hose, fire extinguishers or just an electric toaster. Such confidence and protection must be earned over a period of years, it cannot be purchased.

Building code requirements

The recognition of effective fire-retardant paints is becoming more standardized by the acceptance of the Underwriters' tunnel test as a method of establishing the flamespread or hazard characteristics of various building materials. In particular, the problem of interior combustible finishes in areas of public occupancy, hospital and institutional areas and in exitways of such types of occupancies has become a very serious problem.

The Building Officials Conference of America has established standards of flamespread criteria such as:

0–25 Incombustible
25–50 Fire Retardant
50–75 Slow Burning
75 and over—Combustible

and have adopted such requirements in their National Building Code. The NFPA has also established flamespread standards for their new exit code on the basis of:*

0– 20 Class A
20– 75 Class B
75–200 Class C

Such standards are the first steps in the recognition of the serious hazard of interior combustible finishes including built-up coats of old paint. The flash fire disasters of the past several years in hotels, hospitals and convalescent homes have emphatically pointed to the necessity of more effective protection and regulation against such hazards, particularly in cut-offs, means-of-egress, passageways, stair wells, etc. In a number of such cases the flashover effect has been so great as to overpower existing sprinkler systems.

Listed by UL

Reliable manufacturers of fire-retardant paints have had their products carefully tested, and if satisfactory, listed and labeled by the Underwriters' Laboratories to assure their users of uniform production and reliable performance year after year. It is now possible to buy UL listed fire-retardant paints with the same assurance previously extended to fire extinguishers, municipal fire hose, fire alarm systems and many other fire protection and safety devices and material. This has removed much of the uncertainty frequently found with new and untested products.**

UL listed fire-retardant paints, with an official flamespread rating of 50 or less under the UL tunnel tests, are now accepted for fire insurance credit by a number of the fire rating bureaus in many of their fire insurance schedules when the application is made in accordance with the directions of the manufacturer and so certified to the rating body at the time of application. Among those schedules including this recognition are those covering woodworkers, sash and door plants, box factories, fish processing plants, fruit-nut-vegetable packing plants, milk processing, grain elevators and mercantiles. Consideration given can be determined from your insurance engineer or through your own state rating bureau.

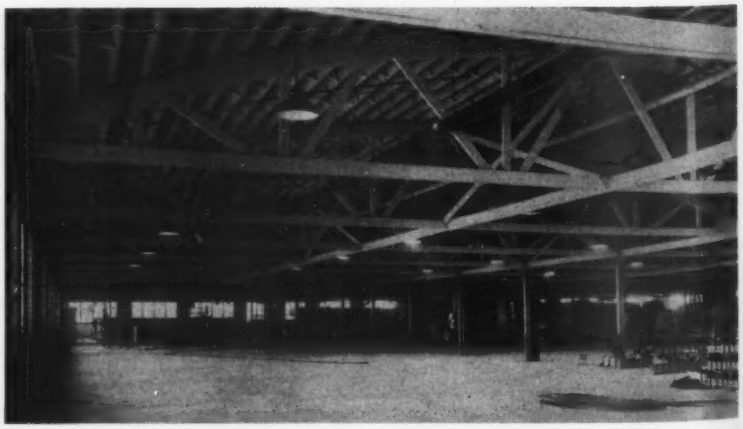
Exacting tests conducted by both the Underwriters' Laboratories and the Factory Mutual Laboratories under controlled conditions prove that the use of listed fire-retardant paints will provide many valuable minutes of delaying action against the total involvement of exposed areas. For example a standard 4 x 8-foot unprotected plywood panel can be completely involved with 100 per cent flamespread in less than two minutes when exposed to the heat and flame from just half a gallon of gasoline—and entirely consumed by this exposure fire in less than seven minutes! On the other hand the same type of plywood panel, protected by one of the UL listed fire-retardant paints, will resist the same type of exposure fire under exactly the same conditions and with very little or no damage to the plywood.

Under more severe fire conditions an unprotected portion of a wood surfaced wall was completely involved and burned through in less than eight minutes, while

Continued on page 890

* National Fire Codes, Vol. III, 1956, NFPA.

** See Underwriters' Laboratories, Inc. Fire Protection Equipment List, January 1957. Pages 19 to 23.



Protecting large-area open-joint bow-truss construction of modern factory. Although sprinklered, in addition it is protected with fire retarding paint. The 280,000 square feet of ceiling area required 1,465 gallons applied by spraying a single coat at the rate of 190 feet per gallon

Here's HOW an I.A.F.C. Membership helps YOU in your important work . . .

• INFORMATION •

You get authentic, up-to-date information and special reports from the Association on all phases of Fire Service activity; also the FIRE CHIEFS NEWS LETTER each month containing news of the regional Associations, members and any legislative proposals of interest affecting the Fire Service. Keeps you informed about what others are doing to improve administrative operation.

• EDUCATION •

You receive current Bulletins of special interest prepared by the National Board of Fire Underwriters and all the new pamphlets, regulations and research developments from this organization. Selected subjects of pertinent value from other conferences are reproduced for your reference library. In the Annual Proceedings of the Association you get a documentary record of the Annual Conference with all technical papers presented at the meeting.

• PARTICIPATION •

Attendance and participation in international, regional and committee conferences with other Fire Chiefs and Fire Service leaders produces a continuous interchange of ideas and experiences of practical value. You take part in the Annual Conference of the I.A.F.C. — the largest gathering of Fire Officers in the world.

You see the largest display of new designs of fire apparatus and equipment in the world and meet other experts in your own field. Make yourself a more valuable, better informed officer in your fire department. Take advantage of these excellent opportunities to serve and operate your department. Join this active, forward-looking Association now!

Active or associate membership in I.A.F.C. is open to all active fire department chief officers, industrial fire chiefs, fire chiefs of military installations, state and provincial fire marshalls.

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also includes membership in the Division Association for your region.

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INTERNATIONAL ASSOCIATION OF FIRE CHIEFS

HEADQUARTERS OFFICE
232 MADISON AVENUE
NEW YORK 16, N. Y.

SPACE CONTRIBUTED BY SUSTAINING MEMBERS I.A.F.C.

Aerial view of central area of the Jamboree showing six of the 38 sections of the camp. Fire Station No. 2 can be seen directly above the memorial arch. Fire lanes were maintained so that fire apparatus could be driven into each camp section —*American Aerial Survey photo*

How the Boy Scout Jamboree Was Protected Against Fire

Careful preplanning safeguarded tent city of 60,000 persons at Valley Forge State Park

By J. DOUGLAS BIRD, JR.
Fire Chief, Valley Forge Army Hospital

MORE THAN 1,000 volunteer firemen from 116 companies located in the three Pennsylvania counties surrounding the sprawling Valley Forge State Park provided fire protection for the Fourth National Boy Scouts of America Jamboree held July 9 to 21st. When the tents of over 1,200 troops sprouted up in three days into a tent city of nearly 60,000 persons, there was created what has been estimated as the 28th largest city in the nation—and with it all the fire hazards that might be associated with such an enterprise.

Planning for the Jamboree started last November with a committee appointed by the Keystone State Fire Chiefs Association. The committee was composed of James H. Dunn, Chester County fire marshal, as camp fire marshal; Willson Green, Montgomery County fire marshal, as an aide; Frank Dolan, Delaware County fire marshal, also as an aide; and Ed. Robb, Dupont fire chief, as coordinator.

Fire apparatus units were stationed at three locations in the park. Station No. 1, "fire headquarters," was manned by 40 companies from Chester County and one full-time company from the Valley Forge Army Hospital; Station No. 2 was manned by 37 companies from Delaware County, and Station No. 3 was staffed by 37 companies from Montgomery County. The companies worked eight-hour shifts with

Fire in main storage area. This was one of three sections in the camp where pre-fire planning called for three-company response. Shown in photograph are apparatus from Station No. 2 and Headquarters. Station No. 1 held a position at the rear of the fire area. The 1½-inch and 2½-inch lines were supplied with water pumped from tank trucks which also responded to the alarm —*U. S. Army Signal Corps photo.*

What's the difference between EUREKA Multiple-Woven and plain "circular-woven"?

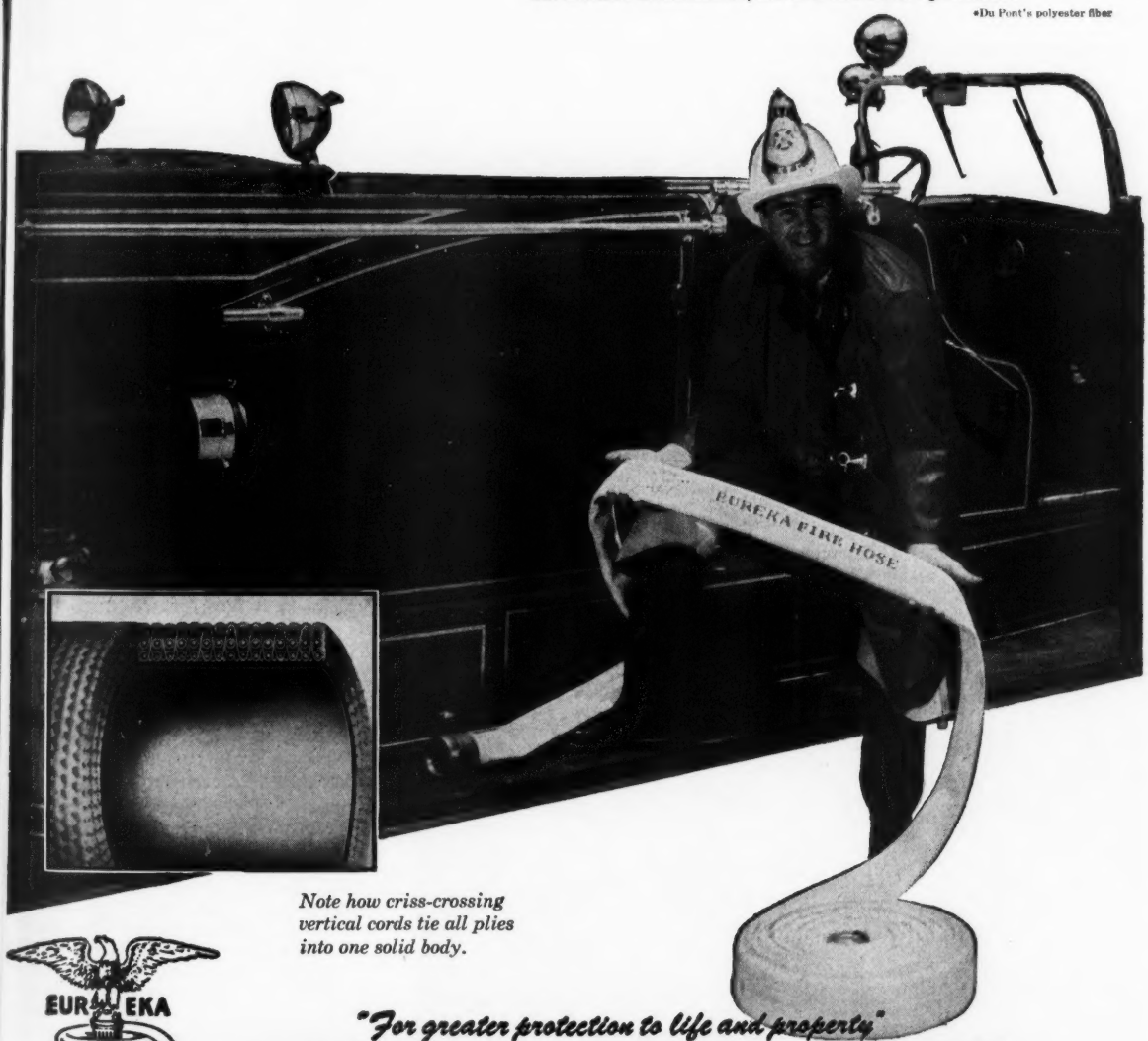
Most fire hose is "circular-woven", one ply at a time. Only Eureka furnishes *multiple-woven* hose.

Want to see the difference? Look at the cross-section of a Eureka multiple-woven hose. Notice those cords running up and down through the plies! You'll find them only in *multiple-woven* hose. The unique Eureka loom not only weaves all plies simultaneously but also weaves through them these additional warp threads that bind together the filler cords of *all* plies into a single homogeneous jacket. Result:

- Greater strength from the same weight of materials,
- No space between plies to collect dirt and moisture,
- Longer, safer service life,
- No writhing under hydrostatic pressure.

Built to withstand pressures of either 400 or 600 pounds, Eureka Multiple-Woven Hose—with filler (circular) cords of cotton or Dacron*—can be furnished in all standard diameters. Your Eureka representative will gladly give you all details. Remember, he is a fire hose specialist!

*Du Pont's polyester fiber



Note how criss-crossing vertical cords tie all plies into one solid body.

"For greater protection to life and property"

EUREKA FIRE HOSE

Since 1875, Specialists in Manufacturing Circular-Woven Rubber-Lined Fire Hose

1 Market Street • Passaic, New Jersey

Division of United States Rubber

Left: "Smokey" observes fire fighters' efforts to extinguish small blaze at the Jamboree. Three Smokeys were on hand in various parts of the camp to remind campers of the dangers of forest fires. James Richards from the New Hampshire State Forestry Department is sweltering inside that costume in the 90 degree heat—*U. S. Army Signal Corps photo* **Right:** Chief Dispatcher Len Emery on phone, with Jamboree Fire Marshall James Dunn (center) and Valley Forge Army Hospital Chief J. D. Bird (left) at Jamboree Fire Headquarters. Note "in and out" board, map and run cards on the desk. All fire calls were received at this point and the companies dispatched—*Photo by Walter W. Shaw*

six men, plus a company fire marshal on each shift.

Protection for the large number of huge army tents serving as headquarters, large supply dumps, motor pools, and construction camps which sprang up many months before the actual encampment, and which will remain for some time afterwards, was provided by the Valley Forge Volunteer Fire Co., the King of Prussia and Paoli Volunteer Fire Companies.

Heavy supply stocks

In early June, due to the large amounts of supplies in the area, Fire Marshal Dunn requested additional protection from the Valley Forge Hospital fire marshal, Major Melvin R. Jones. That protection was provided on June 11th when soldiers from the Second U. S. Army stationed for support in the park, were trained to operate an Army six-wheel drive, 500-gpm pumper with a 500-gallon water tank, by the Army Hospital firemen. This apparatus remained on the park grounds until the last piece of government equipment was shipped out.

The Army pumper responded to all fire alarms due to its six-wheel drive ability to cross rough terrain, fields and woodlands in the park. The pumper was manned during the Jamboree by off-duty men from the Army hospital fire department who donated their time to the scouts. These men worked 24 hours at the hospital and then 24 hours at the Jamboree.

All fire alarms were received via telephone. Radios in state police patrol cars in the area could be used however, to radio an alarm to their headquarters in the park and the alarm, in turn, relayed by phone to the fire dispatchers.

Sharp-trading Boy Scouts from South Dakota seem to have done it again after having "swapped" their leaky old canoe for Engine P-2 of Coatesville's Washington Hose Company No. 1. The firemen, who manned one of three fire protection stations at the campsite for the regular eight-hour tour, are left to right: Bill Terry; Atlee Harry, Jr.; Howard Wilson, Chester Eckman; Bob Jackson and Charles Frymoyer—*Coatesville Record photo*

Numerous problems faced

The scarcity of rain for two months had turned the usual lush green fields of the park into dry fire hazards. Carefully prepared instructions for the scouts on how to guard their charcoal stove fires, of which there were over 5,000, and how to control camp fires paid off. Fires from these sources were non-existent.

Daily fire prevention inspections were made by fire marshals from each station. They inspected cooking fires, camp fires and storage areas. These inspections insured compliance with fire safety instructions, which were issued daily.

It was found necessary to maintain a supply of fire hose coupling adapters at fire headquarters and issue them to arriving companies due to the various types of couplings in common usage in the area. A few of the common types in the area are: Jones snap, Anderson snap, screw couplings with 6½ threads per inch, and the National Standard type coupling.

At the request of Fire Marshal Dunn, a topographical survey of the park was made by the Valley Forge Army Hospital fire chief and Assistant Chiefs William Winters, John Pratt and Walter Shaw. From the survey, boundary lines were established for each fire station. A running card system was set up for the first, second or third call response of each station. The cards were cross-indexed for every conceivable name or park location. In this manner, no matter what the area was called, i.e., "Area 12," or "The Pennsylvania Area," the nearest fire station in service could be dispatched.

A team of three men from the Pomeroy Volunteer Fire Company, led by former Chief Len Emery, volunteered to serve full-time as fire dispatchers for the Jamboree. They operated the fire headquarters.

Large army tents served as fire stations, although the apparatus was parked outside. The tents were equipped with

Continued on page 882

Maximum Protection with Minimum Cost

Here's an excellent example

of **H & H** craftsmanship in this ONE MAN OPERATED AIRPORT CRASH TRUCK

This unit is the ultimate in protection for airports. This crash truck is equipped with 800 gallons of water, 100 gallons of foam and 350 lbs. of dry chemical. The pump and turret are both controlled from the cab; ground sweeps and under truck nozzles with electric rewind hose reels on each side. Compartments are provided on both sides for emergency equipment. This unit is a one punch vehicle that will conquer any emergency.

H & H FIRE APPARATUS CORP.

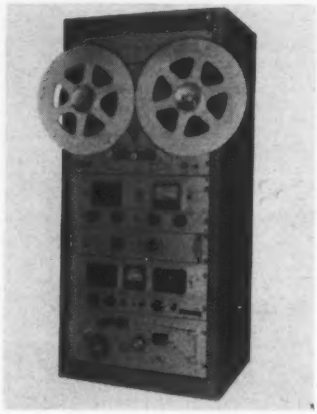
725 TONNELE AVE., JERSEY CITY, N. J.

WHAT'S NEW

Among the Manufacturers

- products
- processes
- personalities

Magnecord Storage Recorder



Magnecord's new 817-DL long term storage recorders and reproducers are now available, according to an announcement by Hugh J. Daly, general sales manager.

When the instrument picks up any sound or message it turns itself on automatically and off when sound or message stops. A delayed tape loop permits the recording of every sound and eliminates any loss of information. The reels hold 4,800 feet of tape. Complete information is available by writing to William R. McEvoy, sales engineer, Magnecord Division, Midwestern Instruments, Inc., 1101 S. Kilbourn Avenue, Chicago 24, Ill.

Cicca Vehicle Warning Horn

The American Fire Equipment Co., 717 Boylston Street, Boston 16, Mass., is at present testing a new vehicle warning horn that is manufactured in France. The "Cicca Tenor 16" operates on air supplied by a miniature electric compressor from a 6 or 12-volt source. It is claimed that the current drain is very small.

At present it is being used on a few chiefs' cars in the New England area. The company states that sales will be restricted to use on fire vehicles only.

Generator Price Reduction

D. W. Onan & Sons, Inc., Minneapolis 14, Minn., producer of gasoline and diesel-powered electric generating plants has reduced prices by 3 to 10 per cent on some 60 of its air-cooled models. The company said the cuts involved the "most popular models" and about 60 per cent of the air cooled line.

Delta Announces Promotions

The Board of Directors of Delta Fire And Safety, Inc., Lafayette, La., has announced the following promotions: W. Frankin Dunlap, formerly secretary-treasurer has been elevated to executive vice president, and Walter F. Roque, board member, was appointed secretary-treasurer.

Elmwood Park Ambulance Equipped with Four-Patient Resuscitator

The Elmwood Park, Ill., Fire Department recenty placed in service a 1957 model Superior Cadillac emergency unit which has a capacity of four prone patients. One of the unique features of this unit is the installation of dual Reviv-A-Life resuscitators and inhalators. The entire layout design and installation was done by engineers of the Midwest Oxygen Equipment Corp., Chicago, Ill. By means of the equipment, four patients may be supplied with oxygen at one time. The unit is also equipped with radio and an alternator provides 110 volts if required.

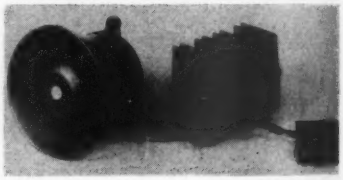
Smoke Ejector-Deodorizer

The Mountain States Equipment Co., 1238 Speer Boulevard, Denver 4, Colo., has introduced Airex, a new portable fan that can be equipped with a smoke and odor neutralizing attachment.

It uses a three-blade cast aluminum propeller and is powered by a ⅓-hp, 115-volt AC 60-cycle motor.

The odor neutralizing attachment which may be conveniently mounted on the fan holds six quarts of liquid under air pressure. A fine mist is sprayed into the air stream for large area dispersal. The attachment is also available with mounting brackets as a separate item for use with other portable fans.

Combined Siren-PA System



Electronic Engineering Enterprises, 116 West Indian School Road, Scottsdale, Ariz., has announced what is claimed to be the world's first transistorized siren and PA system combination. The unit is designed to be used in conjunction with a standard mobile radio and allows operation as a siren, a PA system, or as an amplifier for the radio.

Features claimed by the manufacturer are: Extra loud volume and maximum penetration of destinctive sound; audio output rated at 30 watts under all conditions of operation; instant operation, both starting and stopping; weatherproof; and battery drain of 10 amps at 6 volts or 6 amps at 12 volts.

Gamewell Consent Judgment Suspended

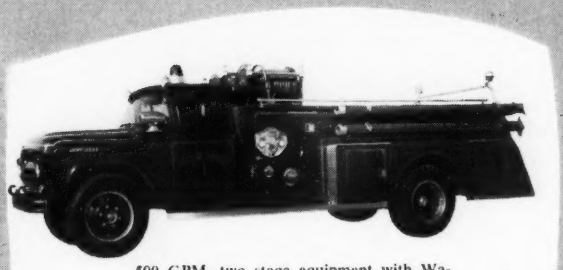
The United States District Court in Boston on July 1st suspended for two years the consent judgment entered into in 1948 between The Gamewell Company, Newton, Mass., and the Department of Justice. This judgment, progressively modified since the date of its original entry, regulated Gamewell's activities in the public fire alarm field in

ENGINEERED FOR EVERY NEED and BUDGET!!

Central's years-ahead thinking gives you more dollar-for-dollar value because you get years-ahead design . . . built-in custom features found only on higher priced jobs . . . a selection of body styles to fit every community need . . . and NOW with Central, you can PUSH A BUTTON and YOU'RE PUMPING WATER!

EASE of OPERATION

ELECTRO-MATIC pumps make every fireman a pump engineer! No foul ups at critical moments. No juggling of valves and controls. Simply press the ELECTRO-MATIC "Prime" button and you're in business. Ideal for the smaller city.



500 GPM, two stage equipment with Waterous Electro-Matic pump, mounted on Ford F-600 chassis.

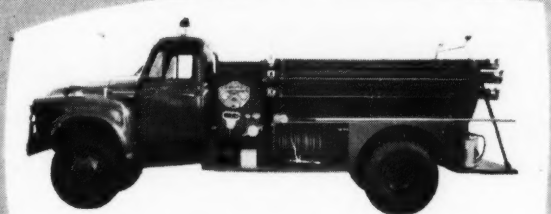
ECONOMY

Here is 1000 gallon Class A equipment on the newly developed COMMERCIAL CHASSIS' at ONE HALF the cost. You save on replacement parts and high priced special service. Any suitable chassis may be purchased locally. ELECTRO-MATIC pumps with push button controls for split second operation.

1000 GPM Class A three stage equipment with Waterous Electro-Matic pump mounted on Reo Gold Comet chassis.

EFFICIENCY

In rural areas where grass and forest fires are a hazard — and in-town protection is also desired — here is the 500 gallon pumper that will do both jobs equally well. This four-wheel drive truck, built on Navy specifications PUMPS WHILE IN MOTION! It provides a high pressure stream as well as volume.



500 GPM equipment with specially designed full torque power take off mounted on International 4 x 4 chassis.

OUR ENGINEERING DEPARTMENT IS AT YOUR DISPOSAL TO DESIGN AND PRODUCE EQUIPMENT TO ANSWER ANY SPECIFIC FIRE FIGHTING PROBLEM.

Send now for more information about this new Central equipment. No obligation, of course.

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FIRE TRUCK
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CENTRAL FIRE TRUCK CORPORATION FE-857
Manchester, Missouri

Please send me full information about:

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Name _____

Address _____

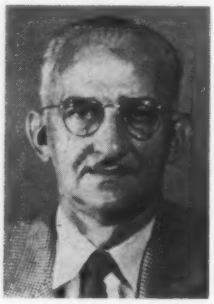
City _____ Zone____ State _____

which the company had gained prominence during its 100 years of manufacture, sales and service. Only a portion of Gamewell's product lines and markets had been affected by the judgment.

The Department of Justice consented to the court's action of suspension which was based on Gamewell's showing that the structure of the industry has changed.

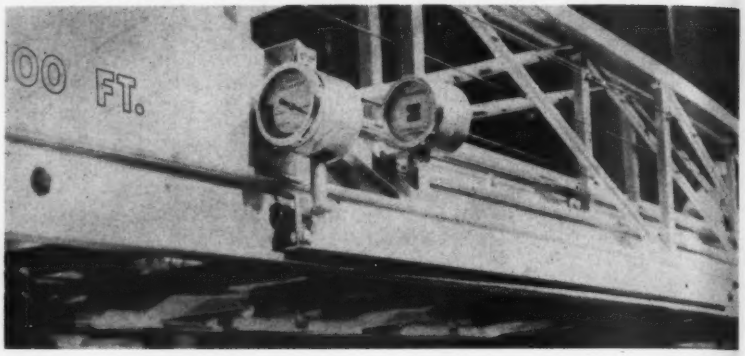
Miller Heads Scott Research

The promotion of Arthur E. Miller to director of research has been announced by Earle M. Scott, president of Scott Aviation Corporation, Lancaster, N. Y.



Mr. Miller joined Scott Aviation in 1944 and since 1951, as chief engineer, has been responsible for the design and development of all types of respiratory protective equipment. He is a member of the Society of Automotive Engineers, Institute of Aeronautical Sciences, American Society of Safety Engineers, Civil Aviation Medical Association and National Resuscitation Society.

Aerial Ladder Load Indicator Announced by Seagrave



The Seagrave Corp., Columbus 7, Ohio, recently announced the availability of an aerial ladder load indicator. The unit shows the condition of stress of a ladder, supported or unsupported, by means of a simple dial marked green for safe, yellow for caution and red for danger.

According to the manufacturer an aerial ladder operator has only to observe the indicator to tell at a glance if safety conditions have been exceeded. By use of the device all calculations of supported or unsupported load conditions are eliminated.

Hale Elects J. S. Bennett

J. S. Bennett, recently appointed assistant to the president of the Hale Fire Pump Company, Conshohocken, Pa., has also been elected to the board of directors.

A fellow of the American Society of Mechanical Engineers, Mr. Bennett is a graduate of the University of Pennsylvania. For many years he was a vice-president and director of the American Engineering Company, as well as vice-president and director of the Affiliated Engineering Company Limited of Canada.

Post Joins Brady Co.

George Decker Post, former sergeant in the N. Y. Fire Patrol, recently joined the Robert J. Brady Co. (Training Aids), Washington, D. C. He will represent his firm in the Metropolitan New York area as training consultant, especially in subjects relating to fire fighting. Mr. Post has had over eight years varied assignments in the New York Fire Patrol including that of chief instructor at the salvage school.

He is a graduate of the New York Phoenix School of Design and the Art Cartoonists & Illustrators School. Mr. Post will also develop and illustrate the company's training packages.

Mr. Post will be remembered by readers of FIRE ENGINEERING as a contributor to the series of texts on "salvage."

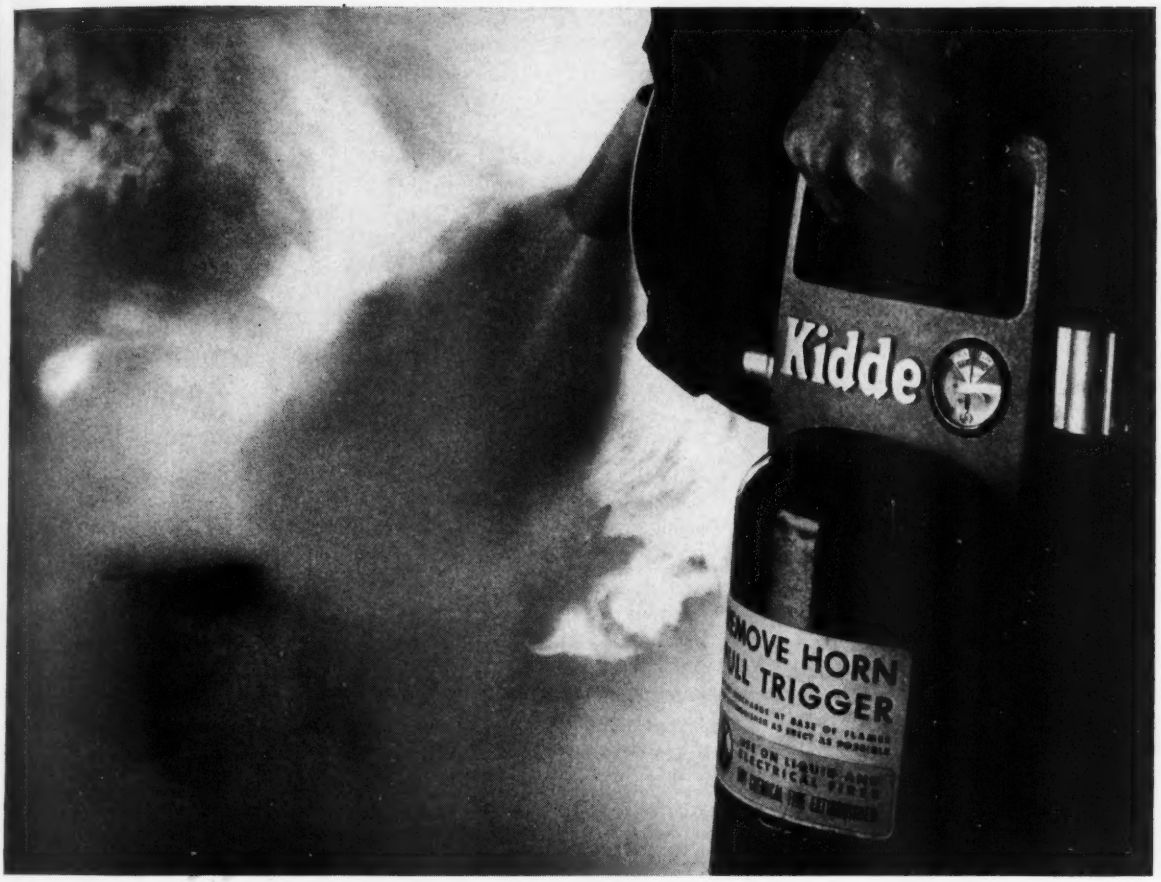
Indian Fire Pumps Used in Recent Forest Fires

D. B. Smith & Co. of Utica 2, N. Y. states that its backpack, portable pumps were used in large numbers during the serious forest fires in California which occurred earlier in the year. The pumps extinguished spot fires and smaller blazes caused by flying sparks, roof fires, brush fires, etc.

The Indian Fire Pump is available in the sliding type and the lever type. Both are approved by Underwriters' Laboratories and each has a 5 gallon tank.

New Military Mask

An "Atomic Age" military protective mask, devoid of any outside canister, has been developed by the Army Chemical Corps and Mine Safety Appliances Company of Pittsburgh. It is claimed the new mask will protect the wearer from radioactive particles as well as a wide variety of war gases; is comfortable and light; has no bulky parts; offers less resistance to breathing than former masks; offers in-



Easiest, fastest way to kill fire...

KIDDE'S NEW DRY CHEMICAL EXTINGUISHER

Here – from Kidde – is the newest, the fastest, the easiest-to-operate dry chemical fire extinguisher!

Look at the extra large, aluminum handle and trigger—even a gloved hand fits comfortably with room to spare. Pick the unit up – it hangs straight – no awkward angle to throw you off balance.

If fire strikes, follow the simple directions: "Remove Horn" – automatically the trigger safety lock is released – "Pull Trigger" – instantly a cloud of fire-killing dry chemical whooshes out of the nozzle and fire's out! With this unit, designed by Kidde engineers working with Henry Dreyfuss personnel, you don't have to be a trained fireman to get perfect results.

Built for a lifetime of use, the handsome new 20 and 30 pound Kidde dry chemical extinguishers have top ratings from Underwriters' Laboratories, require only 225-250 psi charging pressure. The rugged pressure gauge is recessed in handle for maximum protection. Tells at a glance if the unit is ready for use.

Available nationally through Kidde's sales and service organization. Write Kidde today for the name of nearest distributor.

Kidde

Walter Kidde & Company, Inc.
833 Main Street, Belleville 9, N. J.

Walter Kidde & Company of Canada Ltd., Montreal—Toronto

creased vision; and gives the wearer increased speech transmission capabilities.

Instead of the hose and canister so familiar to World War II and Korean War soldiers, the new mask has two pouches containing gas-aerosol filter material, one on each side of the facepiece.

American LaFrance Promotions

The Board of Directors of American LaFrance Corporation, Elmira, N. Y., has announced the election of J. F. Connaughton as chairman and chief executive officer, and Wilfred M. Price as president and general manager. Mr. Connaughton is president of Sterling Precision Corporation, the parent company. Mr. Price has served as executive vice-president of the Elmira corporation for the last five years and succeeds Mr. Connaughton as president of American LaFrance. The position of general manager is a new designation.

J. F. Connaughton

Wilfred M. Price

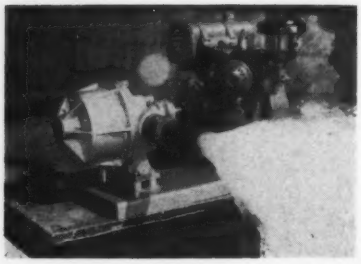
New Fyr-Fyter Extinguisher

A new 2½-gallon pressurized quick-acting extinguisher is being produced by Fyr-Fyter Division of the Fyr-Fyter Company, 221 Crane Street, Dayton, Ohio. The model culminates extended research to adapt Karbaloy extinguishing agent to a pressurized unit.

Advantages claimed for the new unit are simple press-lever control, quick visual inspection of pressure gauge, stainless steel finish, and easy installation in all standard extinguisher cabinets.

The extinguisher is effective against both Class A and Class B fires and was granted Underwriters' Laboratories approval with a U. L. rating of 2-A, 1-B.

New Pump Uses Rubber Rollers



A new positive displacement pump with rubber rollers acting as rolling vanes has been introduced by Hypro Engineering, Inc., 700-39th Avenue N. E., Minneapolis 21, Minn. The pump can be direct coupled to a gear reduced motor or engine, has 2-inch ports and delivers up to 95 gpm at 700 rpm.

A feature is a spring loaded pressure-relief endplate which, it is claimed, protects pump and connecting hose lines from excessive pressures. The pump is reversible, and is said to be self-priming up to 10 feet above the liquid source and once primed, has a suction lift exceeding 20 feet.

White Emergency Light

The Mars Signal Light Co., 4322 W. Chicago Avenue, Chicago 51, Ill., is marketing a white emergency warning light, which is said to command instant attention of motorists moving ahead of fire apparatus and which is designed for fire departments exclusively.

The manufacturer claims that the light will not blind oncoming drivers due to its rapid movement.

Jericho Power Megaphone

A low-priced megaphone of considerable power has been developed by Marconi Instruments, 44 New Street, New York 4, N. Y. An amplifying microphone of special design feeds a directional loudspeaker, drawing current from standard flashlight batteries. The instrument has no warm-up delay and is claimed to be weatherproof.

New Dry Chemical Extinguishers

Two new pressurized dry chemical portable fire extinguishers have been announced by Walter Kidde & Company, Inc., Belleville, N. J. The streamlined models come in 20 and 30-pound capacities.

According to Kidde, the design stresses simplified, self-evident operation. There is no trigger locking pin to remove, no valve to turn. Both are approved by Underwriters' Laboratories and Factory Mutual.

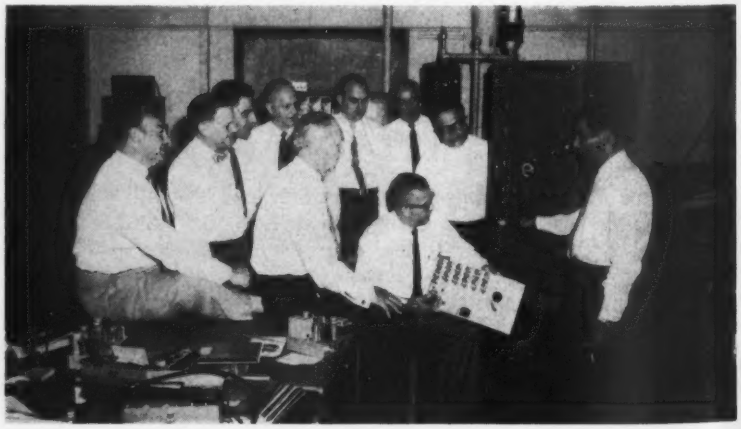
FCDA Accepts El-Tec Radio Traffic Controller

High point of a three-day sales conference of its field representatives on June 27-29, was the announcement by Electronic Protection Inc. that certification of El-Tec radio traffic controllers had been accepted by the Federal Civil Defense Administration.

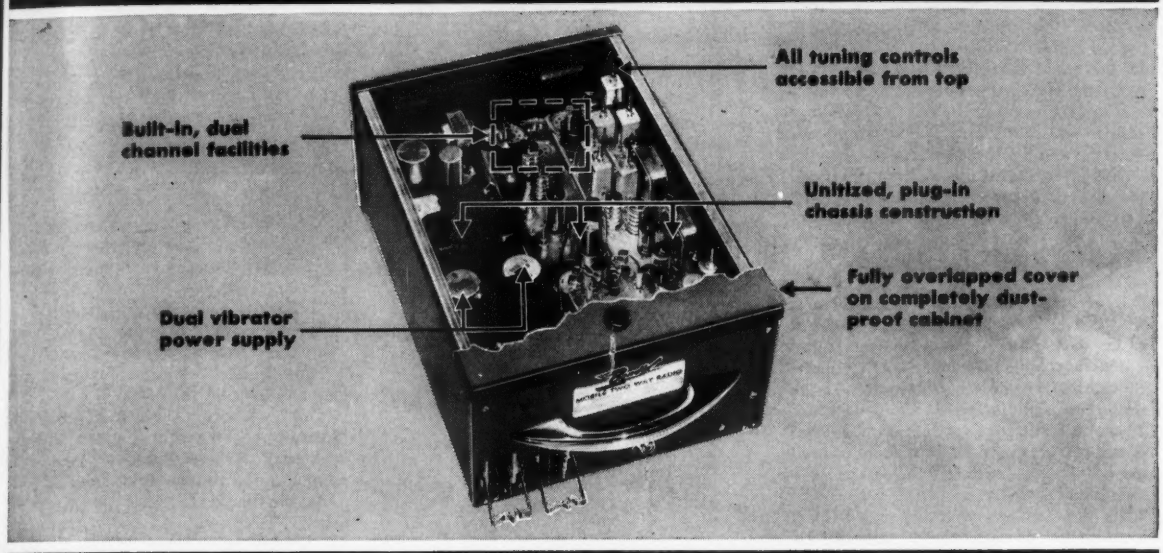
EPI engineering personnel conducted full demonstrations of how El-Tec fulfills the requirements of FCDA as well as radio interconnection for traffic control purposes and emergency vehicle traffic control.

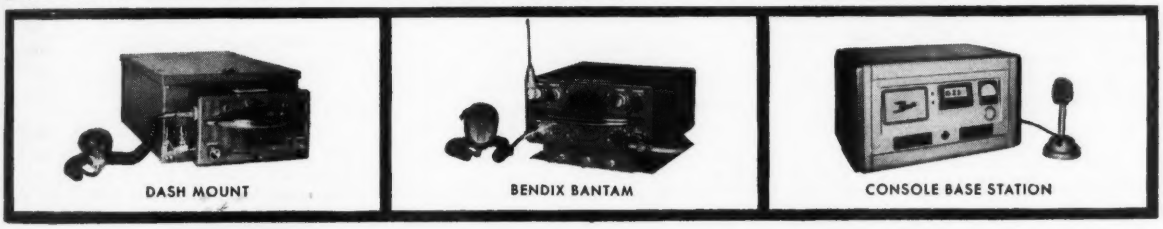
The meetings were held at the firm's laboratory in the suburban Melrose Park plant of Standard Coil Products Company, the parent organization.

Continued on page 899



IT'S HERE! THE BIG ADVANCE IN 2-WAY RADIO FOR FIRE FIGHTING


All tuning controls accessible from top
Built-in, dual channel facilities
Unitized, plug-in chassis construction
Fully overlapped cover on completely dust-proof cabinet
Dual vibrator power supply



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ALL NEW! BRAND NEW! MOBILE UNITS AND BASE STATIONS

The result of over 5 years laboratory research and development, Bendix* Dyna-Com is *the first big advance* in 2-way radio in over a decade. All new from chassis to cabinet, each model incorporates all the latest improvements which have made Bendix the foremost leader in railroad and aviation communications; in airborne navigation; in radar and in military electronics.

For example, Dyna-Com's unitized design sets a new standard for performance and dependability. It features plug-in, interchangeable chassis construction which speeds service and saves maintenance costs. Any chassis in the Dyna-Com line can be transferred, without adjustment or modification, between mobile units and base stations.

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All units are fully enclosed in rugged, weather-resistant, steel cabinets. New desk console base stations permit remote vehicles to be contacted in minimum time. Operating controls are located on front panel, which includes loudspeaker, cyclotron clock and meter with a 17-position switch for instant, finger-tip monitoring of all circuits.

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FALSE ALARMS

Living It Up

After 40 years in a little country village, a couple sold their place and moved to the great big city where they could enjoy the comforts of life.

The first morning the wife arose before sunrise and said: "Isn't it about time you were up and lighting the fire?"

"Nope," yawned the old man. "I'll call the fire department. We might as well get used to these city conveniences right now."

The couple arrived early at the theatre. The girl excused herself and slipped out of her seat to go and mend her make-up.

She had difficulty locating the cloakroom, but eventually entered a large room, furnished in the old Victorian style. There was no one about save a maid dusting a chair. Carefully she restored her make-up, adjusted her hair and straightened the seams of her stockings. Then she hurriedly worked her way back through the passages to her seat and sat down beside her escort. The play had started. "How did it begin?" she whispered to her boy friend.

"You should know," was the terse reply, "You were in it."

A family bought a very intelligent dog. The first night after coming home they found him on the sofa so they punished him. The second night when they came home they found him not on the sofa but near it and acting nervously. They felt the sofa and found it was warm. Again they punished him. On the third night, however, in order to surprise him in the act they came home early and peered through the window. He was excitedly blowing on the sofa.

A Texan once ran for sheriff. He was badly licked, getting only 55 votes out of a total of 3500. The next day he went down the street with two guns hanging from his belt.

"You weren't elected sheriff and you don't have the right to carry guns," his fellow citizens told him. "A man with no more friends than I've got in this county," he replied, "needs to carry some guns."

Now that summer is here, we're reminded of the new suburbanite who, every evening on his return from work, carefully doused his lawn with cologne.

After watching this for some time one of the baffled neighbors could bear his curiosity no longer.

"Why on earth," he asked, " do you do that?"

"To keep the elephants away," was the answer.

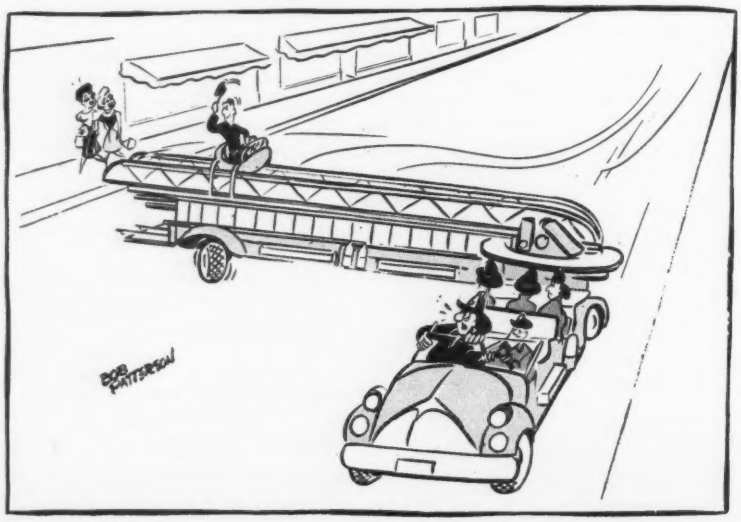
"What! Why, man, there isn't an elephant within 10,000 miles of here!"

"I know," said his neighbor, continuing to sprinkle. "Effective, isn't it?"

"Why can't you behave like that good little girl next door?" The harassed mother asked her daughter.

"She's a doctor's kid," came the reply. "He always keeps the best ones for himself."

Two vacationing businessmen on the beach at Bermuda were having a fine time debating the many charms of movie star Jane Russell. "Don't know what everybody sees in her," exclaimed one. "Take away her eyes, her hair, her lips and her figure, and what have you got?" The other man gave a heartfelt sigh, and said, "My wife!"



"It appears to me Wickford does a great deal of unnecessary rubbernecking!"

Way the Cookie Crumbles

An old gent went to his doctor for a blood test, explaining he was about to get married.

"Really," admiringly asked the doc, "how old are you?"

The old fellow replied that he was 84. Asked how old the bride was, he answered. "She's going on 22."

Very alarmed, the doctor cautioned, "Don't you realize that kind of a difference could be fatal?"

"Well," wheezed the old man with a shrug, "if she dies, she dies."

The Scotsman asked the banker for a loan of $10 and was told that he would have to pay four per cent interest at the end of the year.

"That's 40 cents isn't it?"

"That's right," said the banker, "and what can you give use for security?"

"Twenty-five thousand dollars in savings bonds," said the Scot.

The bank accepted the bonds and gave him $10. At the end of the year, the Scot was back with $10 and 40 cents and asked for the return of his bonds.

As the banker handed them over he asked, "Why, with all these bonds, did you have to borrow $10?"

"Well," said the Scot, "do you know any other way I can get a safety deposit vault for 40 cents?"

A prim old Quaker lady was driving her shiny new car on a Philadelphia street when it was struck by a big truck which crumpled her fender and otherwise badly marred her late model.

Although she was infuriated, she remembered her Quaker upbringing and managed to control herself as she shouted to the truck driver: "When thee gets home to thy kennel tonight, I hope thy mother bites thee."

A report has reached us that the Navy is working on an atomic submarine which will stay under water for four years—coming up just long enough for the crew to re-enlist.

A local newspaper reported recently that a slick saleslady, after talking a customer into buying a mink coat at a Decatur store, asked gently, "How would your husband prefer being billed, madam? In a series of piddling amounts, or in one staggering sum?"

Or Day Either!

A woman bought a $300 suit at Hattie Carnegie's and then was appalled to see what appeared to be her suit at Ohrbach's for $32.50. She rushed back to Carnegie's and told them about it. "But, Madam," said the saleswoman, "the Ohrbach copy probably wasn't 100 per cent virgin wool."

"At these prices, I don't care what the sheep do at night!" screamed the lady.

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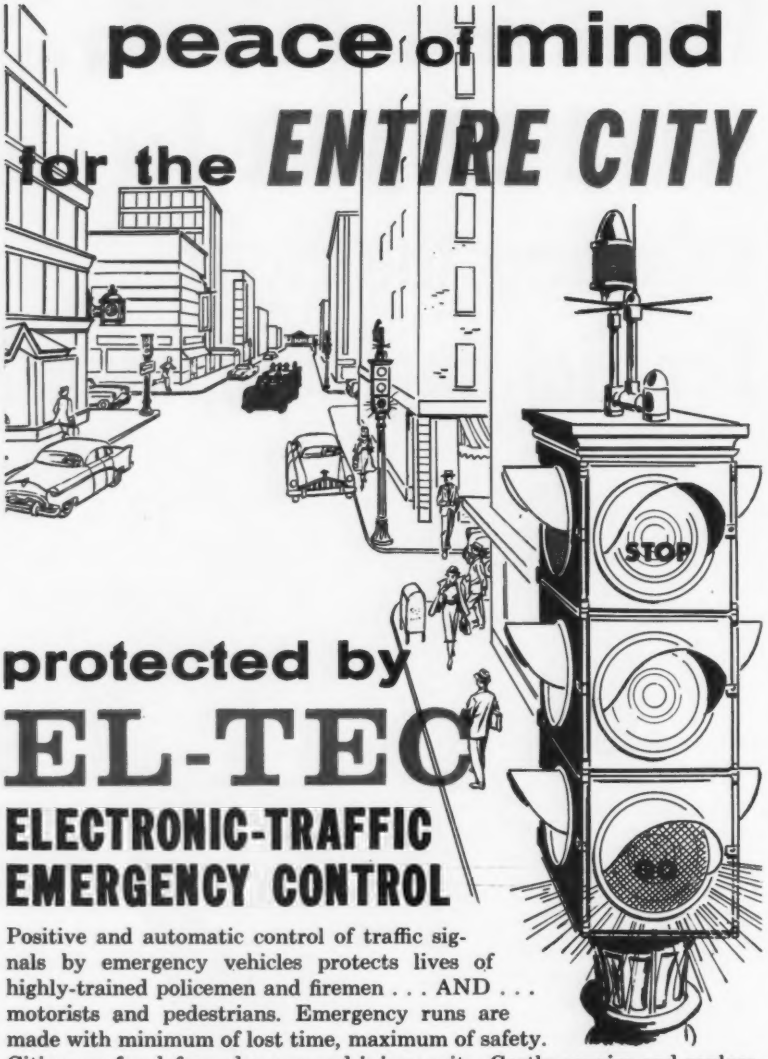

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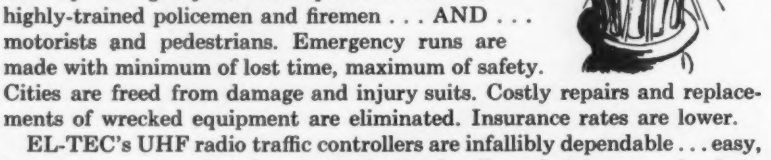

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Among the Buffs

By Paul C. Ditzel

AS YOU'VE NO DOUBT GATHERED if you've thumbed through the preceding pages of this jumbo issue the theme struck is one of progress in the fire service. Going hand in hand with this quest for better ways of serving their communities are our fire buff clubs.

Typical of buffs' genuine interest in their department, fire fighting and fire prevention in general is the Friendship Fire Association of Washington, D. C., whose record of service is second to none. This, the first of a series of planned articles on the history and work of our leading buff clubs, will show how the Friendship organization, certainly no stranger to readers of this column, has evolved into the very excellent group that led one chief to say, "They're the best friends we have and it has never hurt anyone to have a lot of friends!"

Thanks go to Roy A. Wiseman, secretary and charter member of the Friendship club who put together a comprehensive history which was graciously forwarded to this column by Editor Roi Woolley.

In a city like Washington which lists some of the most famous buffs of all time —Oliver Wendell Holmes, for instance, who often chased engines on foot while pulling his wife by hand even in their advanced years—the club found a ready core of stalwarts when the late Dr. Edward R. Gookin, an eye specialist organized the club on December 3, 1940. (Dr. Gookin, incidentally, was a charter member of the famed Box 52 Association of Boston.)

The new group took its name from George Washington's fire company in Alexandria, Va. Its insignia was adapted from the fourth fire mark of the Firemen's Insurance Company of Baltimore.

Among the original Friendship b'hoys were Lester H. Steinem, a corporation counselor; Robertson Page, House of Representatives Press Representative; and James Hurlbut, later one of the first Marine Corps combat correspondents. Jim, incidentally, was a friend of this columnist when he was a reporter in Chicago and we covered many a fire together. Jim, too, is well known to national TV-viewers as the co-host with Marlin Perkins of the famous "Zoo Parade" program.

Down through the years the Friendship group was always on hand to cheer its heroes on. Occasionally the firemen were doubly happy to have them. On June 22, 1942, Buff Milton Korman was on his way to an Association meeting when he took in a second alarm from Box 163 at 13th & H Streets, NW. Brer Korman rescued Private J. C. White of Truck Company No. 3 who was overcome in the smoke-filled basement of the fire building.

Three years later history virtually repeated itself when member Dr. William Claudy came upon the unconscious body of the captain of Engine No. 6 in the basement of the House of Representatives

building and pulled him to safety. This incident occurred during a two-bagger in the basement of the House. To this day both Brer Korman and Dr. Claudy don't do much talking about their actions.

As has been reported frequently in this column, the Friendship group is continually trying new ideas to further the cause of their department and the firemen in it. In 1943 when bells and a few exhaust whistles were all that the firemen could use to warn of their apparatus' approach, the buffs pitched in to help persuade the D. C. Commissioners and the military authorities to lift the ban. Serving as a liaison group, the Friendship Association finally pushed through a successful program to lift the ban on sirens, but only after a fatal crash involving a hook and ladder company in which Private Francis Owen was killed.

In the early days of World War II when enlistments in the Auxiliary Fire Service of the city were lagging the Friendship Association stepped into the gap and in addition to serving themselves won newspaper support of a campaign to increase the auxiliary forces. The campaign netted sufficient manpower to operate all of the equipment then in the city.

Other projects of the Friendship Association included the construction of an electrical map to assist the alarm office's transfer officer during a multiple alarm. Too, the Friendship Association has continually operated a canteen for the use of firemen at large blazes. And they continually tell the fireman's story to the layman who sometimes is inclined to think firemen loaf all day, that they turn out a dozen pieces of apparatus wastefully for a trash fire and that firemen ruin more with water than does the fire itself.

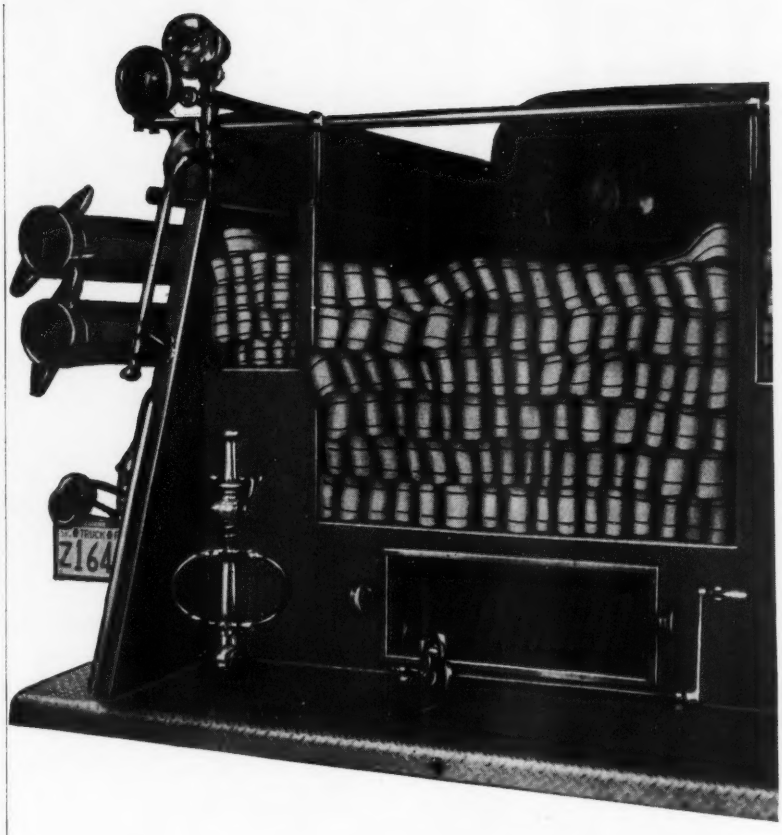
In April 1946, Chief Murphy of the department invited the association to move to the larger quarters of Engine 31 where they are presently housed. These quarters also serve as a museum for DCFD historical items.

Secretary Wiseman concludes his narrative with a point which many buffs might find of value when explaining his interest in things firemanic.

"The interest of buffs in following fires is entirely different from that which motivates the formation of a crowd of idly curious spectators at a downtown fire," says Secretary Wiseman. "The true buff will not walk a block to see a bonfire. It isn't the sight of an unattended, raging flame that attracts him but the *contest* to put out the fire that holds him enraptured. . . . The tougher the fire, the greater is the attraction; the better the job of fire fighting done, the greater is his thrill."

The buffing fraternity could do with a whole lot more groups like the men of the Friendship Association.

Speaking of worthy buff projects, Lieutenant Martin Chayette of the New York Fire Department suggests that buff clubs might want to look into the idea of starting a basic library of fire protection material for the use of their departments as well as the public. He'll be glad to tell how he set up a library, now part of the



New Tuff-Edge® Hose defeats wear at the folds, where most failures begin

Here's a lighter weight, more flexible fire hose that stands up under the worst punishment of all—constant folding and unfolding! Longer life is built right in to Delaware Brand TUFF-EDGE HOSE by Quaker.

Reinforcement of the vital fold edges by 100% polyester filament gives TUFF-EDGE HOSE new high resistance to flexing, faster drying in folds and creases (where mildew formerly could start), maximum flexibility for more compact loading and racking.

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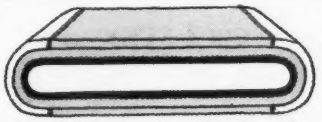
For complete information, write H. K. Porter Company, Inc.; Quaker Rubber Works, Philadelphia 24, Pa.; or Pioneer Works, Pittsburg, Calif.



Edge reinforcement of synthetic fiber takes repeated folding without failure, dries fast, reduces weight, saves storage space. Patent applied for.

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FE-87

Brooklyn Public Library's science and industry division, if clubs will write him at his home, 1546 St. John's Place, Brooklyn.

It's "Old Hat" now to members of the Nashville Fire Buffs Club, but other buffs might appreciate this anecdote which was sent me some time ago by J. Hunter Matthews, 2513 Highland Avenue, Nashville, Tenn.

A new member, John Irvin, waited a long time for his first fire call. It finally came around midnight on a Saturday: A 4-4 alarm in the heart of the business district. Two buildings were destroyed. Brer John worked all night carrying coffee, lugging hose lines and making himself as useful as the chief officers wished.

On his way home he heard a loud explosion and saw two sidewalk manholes with their covers blown off. Great volumes of black smoke gushed from the ground. So what did John do? Naturally, he located the nearest fire box and gave it a pull. The fire companies soon had the fire under control. So long as John is a buff he'll never forget *that* night.

Another report I've been saving for some time comes from the Fire Alarm Club of Cleveland, Ohio, via R. S. Williamson, 2733 Wagar Road, Rocky River 16, Ohio, chairman of public relations. (As auspicious a title as we've seen in some time.)

Reports Buff Williamson: The Club served 3,000 cups of coffee last year while covering all of the city's 18 fires of three alarms or more. Among the most spectacular blazes, he says, were those occurring in a rag shop at East 37th and Central for which a 5-5 was sounded; a factory at West 32nd and Clark; a tar products factory at Woodhill and Quebec, and two multiples in one day; one for a factory at East 87th and Buckeye and a box factory the same afternoon at East 9th and Woodland.

Buff Herbert Joseph Eysser of 2860 Bailey Ave., Bronx 63, N. Y., comes into the hobby in quite a spectacular manner. By the time this sees print he will have been made an auxiliary fireman and for good reason. Herb's dad is a member of the New York Fire Patrol and has been for 28 years. He rescued six persons in a tenement and received the Alfred E. Johnson Medal and also won the New York News' Award of February 1930, as the most heroic fireman or policeman in the city for that month. Herb also has an uncle who is an auxiliary on 107 Truck.

Another young buff is Johnny Wickham of 207 West State Street, Ithaca, N. Y., who says he specializes in the night and early morning fires! Despite his youth, John has a collection of old and new firemanic items including about 75 equipment catalogs. He's been through the American LaFrance Corporation plant on two occasions and is looking forward to a junket to the Ward LaFrance factory.

John's mother gave him the attic to install his display. Seems she is a good booster of things firemanic inasmuch as she is the deputy director of Civil Defense in Ithaca and Tompkins County.

John therefore lays claim to being the assistant deputy director of the same area.

Have an urgent plea from a fire radio fan who recently acquired a war surplus BC 603-D, covering the 20-30 megacycle band. While Nelson Poe is quite a radio expert himself, he's wondering whether any of you have figured out how to convert this set to cover the 30-40 megacycle band in which many departments operate. If you have any suggestions or the solution to this puzzler, he would be quite grateful to hear from you. Write him at 2300 Walnut Avenue, Venice, Calif.

That's it until the bells go down again next month. Please keep the material rolling to 4234 Don Diablo Drive, Los Angeles 8, Calif. □□

What's Burning?

THE FOLLOWING LIST includes fires of $10,000 and over in the United States and Canada for the period from June 20th to July 24th.

Tempe, Ariz.—Tempe plant of Phoenix Citrus Packing Co. destroyed.
Forrest City, Ark.—Bond Motel destroyed.
Malvern, Ark.—Shed containing hardwood flooring at A. B. Cook Lumber Co. destroyed. Lightning bolt.
Arcata, Calif.—Twin Parks Lumber Co. mill and plant damaged.
Ione, Calif.—Laundry at Preston School of Industry destroyed. Careless smoking.
Long Beach, Calif.—Seven businesses in Long Beach Plaza Shopping Center damaged.
Los Angeles, Calif.—Tommy Newton's Cabinets Co., Thomas Newton Interior Furnishings Co. and Janet of California Dress Manufacturing Firm, damaged.
Madera, Calif.—Triangle T Ranch of Foremost Dairy Co. feed mill destroyed. Faulty electrical equipment.
Oroville, Calif.—New Stokeley-Van Camp cannery destroyed. Acetylene tank explosion.
Oxnard, Calif.—Ventura Farms Frozen Foods plant damaged. Explosion.
Palo Alto, Calif. — Frank Walt Automobile Agency destroyed. Static electricity.
Red Wood, Calif.—Warehouse at El Camino damaged.
Sacramento, Calif.—Russ Supermarket at Rio Linda damaged.
Sacramento, Calif.—Garage of National Ice and Cold Storage Co. destroyed.
San Francisco, Calif. — Tad's Broiled Steak House damaged.
San Francisco, Calif.—La Sonoma Apartments damaged.
San Rafael, Calif.—Two hangars and seven planes at San Francisco Bay Airport, damaged. Careless smoking.
Santa Fe Springs, Calif.—Ralph Wilson Plastic Co. plant and Junior maternity garment plant, damaged. Electric shortage in transformer.
Walnut, Calif.—Dwelling of late William Banning damaged.
Adams City, Colo.—Adams City Lumber Co. damaged.
Rockland, Del.—Converting plant of Doeskin Products Inc. destroyed. Electric switch box.
Jacksonville, Fla.—Professional building housing Furchgott's Department Store, damaged.
New Port Richey, Fla.—Combination gasoline station, grocery store and apartment of David Harris destroyed.
Sylvania, Ga.—White House Cafe, beauty shop, jewelry store, gas company office, shirt manufacturing firm, office building and apartment, damaged. Butane gas leaking from truck exploded.
Chicago, Ill.—Buildings at 2021 to 2031 and 2030 to 2036 W. Cermak Road housing grocery, repair shop, hosiery store, L. Rathburn's Dancing School and dwellings, damaged. Trailer-truck explosion.

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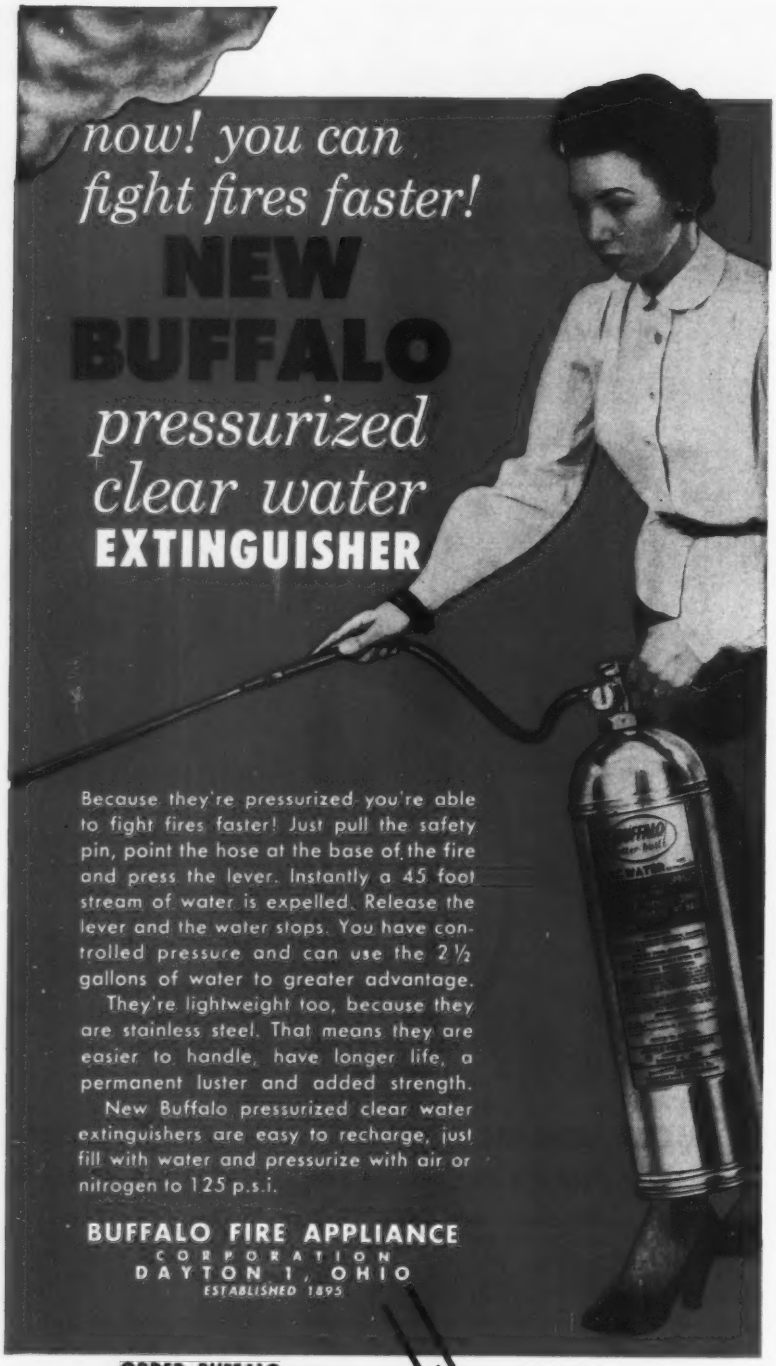
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Chicago, Ill.—Soy bean protein division of Glidden Co., damaged. Dust explosion.
Rochester, Ind.—Fulton County Highway Department building damaged.
Cherokee, Iowa—Building housing Harold McWilliams drugstore, two doctors' offices and beauty salon, destroyed; adjoining American Barbershop, Bell Insurance Office and Baumann's Bakery, destroyed.
Ralston, Iowa—Feed mill of Farmers Co-operative Association soybean elevator destroyed.
Lebanon, Ky. — Lerman Brothers Department Store and adjacent George's Store, damaged.
Owingsville, Ky.—Church of Jesus Christ of Latter Day Saints destroyed.
Monroe, La.—Thirty-two units of recently completed Holiday Inn Motel destroyed.
Presque Isle, Me.—U. S. Air Force supply warehouse destroyed.
Baltimore, Md.—Printing plant housing H. L. Eikenberg Co., Neo-Lith Color Craft, Inc. and others, damaged.
Baltimore, Md.—Pier 4 housing Bailey Express Co. warehouse, severely damaged.
Elkton, Md.—William B. Merrey & Sons building destroyed.
Framingham, Mass.—Friars Restaurant, South Middlesex Co-Operative Bank, Allen's Department Store, Kerwin's Shoe Store and Hasting's Men's Shop, damaged.
South Royalston, Mass.—Recreation building at Camp Caravan for physically handicapped children, destroyed.
Worcester, Mass. — Six dwellings damaged when jet plane exploded over residential Indian Lake Section.
Detour, Mich.—Dwelling of late John T. Nevill, destroyed.
Ionia, Mich.—Ionia Manufacturing Co. plant damaged. Flash fire in paint spray booth.
St. Louis, Mo.—National Food Store, Ozark Paint Store destroyed; Village Grill, Towne Shop, Humpty Dumpty Playland and Miller-Jones Shoe Store, damaged.
Kalispell, Mont.—Devoe Lumber Mill destroyed.
Clementon, N. J.—Dwelling of Peter Valenti damaged.
Mount Freedom, N. J.—Klode Hotel damaged.
Paramus, N. J.—Famous Brand, women's apparel store, damaged.
Pine Brook, N. J.—Plant of Curran Brothers, roofing manufacturers, damaged.
Weehawken, N. J.—Eazor Express Truck terminal damaged.
Williamstown, N. J.—Farmers' Market and Auction damaged. Arson suspected.
Buffalo, N. Y.—Buffalo Marine Mart warehouse damaged. Spark from electric drill.
Center Moriches, N. Y.—Six dwellings destroyed and 2,000 acres of Suffolk County woodland scorched. Woman burned trash without permit, spreading fire to grass.
Hornell, N. Y.—103-year-old Christ Episcopal Church, valued at over $500,000, badly damaged. Possible arson.
Quoque, N. Y.—Surf Club destroyed.
White Lake, N. C.—Two bath houses, bowling alley, soda fountain, cafe and concessions at Crystal Beach, destroyed. Discarded cigarette.
Canton, Ohio—Turntable Record Co. Shop and Miller's Shoe Store, destroyed. Arcade Beauty Shop, Edwin H. Walker Construction Co., Rice's Office Supply Co. and National Beauty College, damaged.
Cleveland, Ohio—Rud Machine Co. warehouse and ship repair shop, damaged.
East Liverpool, Ohio—Building housing Loblaw Supermarket damaged. Overheated motor in refrigerated system.
Astoria, Ore.—Aston Agricultural Experiment Station destroyed. Oil explosion.
Florence, Ore.—Florence Theatre destroyed.
Ontario, Ore.—Benson Glass Co. destroyed. Short circuit.
Pendleton, Ore.—North Pendleton Warehouse Co. destroyed.
Portland, Ore.—Laurel Hotel damaged.
Portland, Ore.—Electro Measurements Inc. destroyed. Overheated oven.
Portland, Ore.—Hillsdale Restaurant destroyed.
Portland, Ore.—Barron Greenhouses damaged. Defective wiring.
Redmond, Ore.—Redmond Auto Parts Co. destroyed. Explosion.
Salem, Ore.—Crestwood Lodge destroyed.
Sandy, Ore.—Farr Lumber Co. destroyed.
The Dalles, Ore.—Firestone Store damaged.
Altoona, Pa. — Building occupied by Cassidy Candy Co. and Livingston Bakery, destroyed. Boy accidentally dropped lighted match in turpentine.

Chester, Pa.—Thirty-six apartments and three business firms heavily damaged.
Dayton, Pa.—Barrett Lumber Co. damaged.
Erie, Pa.—Ten cruisers and their boat houses near public dock, destroyed.
Lebanon, Pa.—Warehouse of Lebanon Chemical Corp. damaged. Lightning.
Lititz, Pa. — Moravian Church and rectory destroyed.
Philadelphia, Pa.—Pulaski Hall, operated by Pulaski Beneficial Association, damaged.
Philadelphia, Pa.—Furniture store of Jay Browosky damaged.
Turbotville, Pa.—Smith's Village Store, dwellings of James Smith, George Somers, barn and combination garage and appliance store, destroyed.
Jackson, Tenn.—Hendrick Pipe Manufacturing Co. building destroyed.
Kingsport, Tenn.—Borden Mills, cotton cloth manufacturing plant, damaged.
Knoxville, Tenn.—Mill section of Witt Lumber Co. damaged. Lightning.
Memphis, Tenn.—Three warehouses of Chris Fielder, Inc., roofing contractors, damaged.
Galveston, Tex.—West Muecke boat warehouse, docks and at least 30 boats, damaged.
Colonial Beach, Va.—Tidewater Telephone Co. exchange damaged.
Harrisonburg, Va.—Swift & Co.'s poultry processing plant damaged.
Lynchburg, Va.—New medical office building badly damaged. Blow torch used on plumbing.
Warwick, Va.—Rich's Supermarket damaged.
Aberdeen, Wash.—Suburban dwelling of Robert M. Ingram, Jr. destroyed.
Clayton, Wash.—E & E Department Store destroyed.
Colfax, Wash—Weitman Flour Mill destroyed.
Goldensdale, Wash.—Klickitat Valley Grain Growers' elevator with 100 tons of grain, destroyed.
Othello, Wash. — Hamilton Potato Produce Warehouse destroyed. Acetylene tank explosion.
Palouse, Wash.—Palouse Grain Growers Warehouse elevator destroyed.
Port Townsend, Wash. — Milwaukee Railway Pier damaged. Beach fire.
Seattle, Wash.—Strand Construction Co. damaged.
Tacoma, Wash.—Northwestern Glue Processing Co. destroyed.
Walla Walla, Wash. — Campbell Industrial Cleaners destroyed.
Walla Walla, Wash.—Columbia Hotel damaged.
Yakima, Wash.—Yakima School Administration Building destroyed.
Green Bay, Wis.—McDonald Lumber Co. warehouse, housing Green Bay Paper & Pulp Co., Bay West Paper Co. and Charming Paper Mills, damaged.
Madison, Wis.—3,500 young turkeys killed in damaged hatchery. Flash fire.
Westbridge, B. C.—Miller Lumber Co. destroyed.
Chatham, Ont.—Clements Motor Sales, Ltd. damaged. Explosion.
Coboconk, Ont.—Quality Veneer Co. destroyed.
Toronto, Ont.—Three cabin cruisers destroyed; boathouse and other cruisers damaged. Boathouse rented from Harbor Commission.
Windsor, Ont.—Grandstand and stage at city's Jackson Park, destroyed. □□

Southeastern Association of Fire Chiefs Elects

The Southeastern Association of Fire Chiefs held its annual meeting on July 8-9 in Nashville, Tenn., with Chief C. W. Wyrick, Greensboro, N. C., presiding.

Newly elected officers include: Chief B. J. Padgett, Alexandria, Va., president; Chief Newton L. Wheeler, Miami, Fla., first vice-president; Chief C. L. Cox, Durham, N. C., second vice-president. Chief Earl R. McDaniel, Lexington, Ky., was named I. A. F. C. director and Chief G. A. Mitchell, Opelika, Ala., was re-elected secretary-treasurer.

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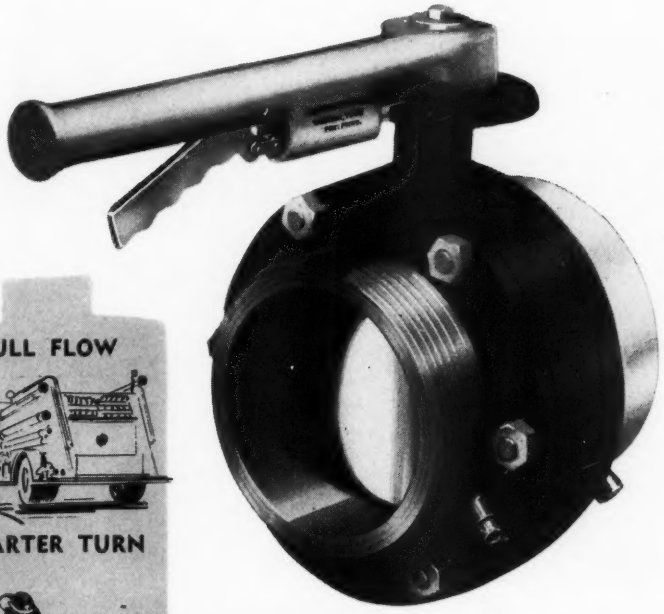

INSTANTLY **switched from tank to hydrant without water stoppage . . . and with adequate supply**

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The "NEW YORKER"
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The "SEAMLESS"
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The "STREAMLINER"
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No. 900
The "CLIFTON"
REGULATION
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The "CAVALIER"
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THE FIREMAN'S FIRST LINE OF DEFENSE

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We can supply, in addition, everything the fireman needs for his personal equipment. Write for Catalog 351.

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Questions and Answers

Water Thief Problem

To the Editor:

A line of 2½-inch hose 200 feet in length is equipped with a ⅞-inch nozzle. At approximately 100 feet, a gated water thief is attached with two lines of 1½-inch hose, each 150 feet in length and equipped with ½-inch nozzles. In order to obtain 50 psi on all three nozzles what engine pressure would be required?

G. L.

Answer: First convert the entire layout to an equivalent single length of 2½-inch hose, as follows:

(a) Convert 1½-inch hose to 2½-inch equivalent by dividing 150 by the factor .074 which equals 2027 feet of 2½-inch hose.

(b) Convert equivalent to that of two such lines by the factor 3.6 which equals 563 feet of 2½-inch hose.

(c) Find average length of line ahead of water thief by adding equivalent to 100 foot length of 2½-inch hose and divide by 2 which equals 332 feet.

(d) Add this total to length of line from pumper to thief which equals 432 feet total equivalent length.

(e) Combine the nozzles by squaring the diameters, add all together and find the square root of the sum:

$$\begin{aligned} \tfrac{7}{8}\times\tfrac{7}{8}&=.875\times.875=\ .76\\ \tfrac{1}{2}\times\tfrac{1}{2}&=.50\ \times.50\ =\ .25\\ \tfrac{1}{2}\times\tfrac{1}{2}&=.50\ \times.50\ =\ .25\\ .76&+.25+.25=1.26 \end{aligned}$$

$\sqrt{1.26}=1.1$ equivalent nozzle

(f) Find "K" of equivalent nozzle by formula $K=D^2\div 10$

$K=1.46\div 10=.146$

(g) Substitute in formula $E.P.=N.P.\times(1+KL)$

$E.P.=50(1+[.146\times 8.64])$

$E.P.=50(1+1.26)$

$E.P.=50\times 2.26$

$E.P.=113$ psi

Placing Pumpers In Relay

To the Editor:

Three pumpers are going to relay water from draft for a distance of 3000 feet. One pumper is 750-gpm capacity, another 600-gpm, and the third is 500-gpm. Which pumper should be placed at draft and where would the other pumpers be placed including their order in the line and distance apart?

K. E.

Answer: When three or more engines are to be used in a line of hose to relay water a great distance, the simplest layout is to place the engines at equal distances apart. In this case they would be 1,000 feet apart. This does not give 100 per cent efficiency, but is the simplest manner of placing the engines and the quickest to accomplish.

When engines of different sizes are be-

ing employed in a relay, the common practice is to place the large engine at the source of supply. Theoretically the reverse would be better, for it is the engine near the fire that must have the margin of power in the event lead lines are lengthened or greater nozzle pressures are required than were originally calculated.

Water In a Safe

To the Editor:

In Japan, tradition says that a glassful of water in a safe will prevent more or less its contents from singeing in case of a fire. Would you please let us have your comments in this regard?

T. M.

Answer: According to tests made by the Safe Manufacturers National Association the use of water inside of a safe is of no value. It will not improve the fire resistance of the safe or its contents.

What's the Meaning of "Jake?"

Question: **Can you tell me the meaning of the term "jake" as applied to the professional, paid, full-time fireman? Down our way, we have heard this term used to describe the fire fighter but I cannot find the derivation. Perhaps you can assist us?**

J. B. C.

Answer: This is one for which we do not have a ready reply. Perhaps some of our readers, particularly those below the Mason and Dixon line, can oblige. □□

Canadian Underwriters Meet with Fire Marshals

The fifth meeting of the Fire Council of Underwriters' Laboratories of Canada was held Wednesday, June 12, in conjunction with the annual conference of the Association of Canadian Fire Marshals which was held from June 10 to 14 at the Sheraton-Brock Hotel, Niagara Falls, Ontario.

The meeting, in the absence of Chairman E. C. Duff, Canadian Underwriters' Association, Toronto, was chaired by J. N. Pryce, director of engineering, Dominion Board of Insurance Underwriters, Montreal. W. Harley Procter acted on Mr. Duff's behalf as host of the luncheon tendered by the Canadian Underwriters' Association.

The agenda included items representative of the wide scope of the work of Underwriters' Laboratories of Canada. The experience of the group was brought to bear upon such matters as extinguishers, oil burner installations, fire hazards of building materials, fire doors, fire protection aspects of handling radioactive isotopes, fire department ladders and fire hose. George H. Tryon, III, assistant technical secretary of the National Fire Protection Association was the guest speaker at a dinner sponsored by Underwriters' Laboratories of Canada for members of the Fire Council and their guests.

SAWZALL SAVES LIVES!

Injured woman being quickly and safely removed from wrecked car by Atlanta, Ga., firemen shown sawing through car panel with SAWZALL.

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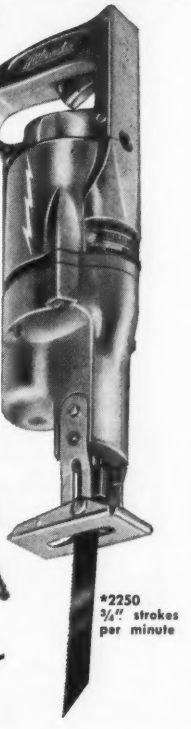
The perfect and ***proven*** rescue tool ... acclaimed by hundreds of fire and police departments. As one chief puts it "It's great for cutting lock bolts in those thick doors and prevents breaking glass." No fire or heat hazards. Fast and safe, too, for removing youngsters stuck in grates, railings, etc.

Milwaukee-built 115V. AC-DC motor. Operates off alternator or other electric generating equipment. Ball and roller bearings. Weight 6¾ lbs. Length 14½". Furnished in steel carrying case with full set of assorted blades for sawing all materials **$89.50**

Act now to equip your fire, safety and rescue crews with SAWZALL. Be ready for every emergency or forcible entry need. **Write for Bulletin SW-6, Milwaukee Electric Tool Corporation, 5354 W. State St., Milwaukee 8, Wis.**



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The A & W PRESSURE COMPUTOR

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If you know your hose lay and tip size, the A & W Computor gives you exact pumper pressures in seconds . . . just by turning the dials. No more guess work, no mental computations, no time or water lost while experimenting with different pressures. You get the answer immediately . . . and you know it's accurate.

- Gives exact pressure settings to produce 50 PSI nozzle pressure on all 1½" or 2½" hand lines from 50' through 1500' for tip sizes from ⅜" through 1¼".
- Gives exact pressure settings for 80 PSI nozzle pressure on master stream appliances using nozzles from 1¼" through 2" supplied by 2, 3 or 4 lines up to 1000'.
- For relays, calculates simultaneously the number of pumpers required, spacing of pumpers and exact pressure for each pumper to obtain 200 GPM discharge at 50 PSI nozzle pressure up to 7000'.
- Mounts quickly and easily on any pumper. Face size only 6" x 11". No connections except for lighting. Trouble-free, built to last. Chrome plated, water-sealed.

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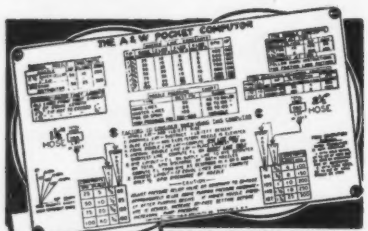

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Ernest L. Maxim Dies

Ernest L. Maxim, 71, chairman of the board of the Maxim Motor Co., which recently consolidated with the Seagrave Corporation, died August 8 at St. Luke's Hospital in his hometown of Middleboro, Mass. He had been ill for some time with a heart condition.

Mr. Maxim had been active since his youth in the plant founded by his late father, Carlton Maxim, starting as a bookkeeper in 1914. One of the pioneers in the field of motorized fire apparatus, he had served on the Fire Advisory Board of the Federal Government during World War II. Following the war he was instrumental in reorganizing the Fire Apparatus Manufacturers Association, serving a term as president and later as a director of the Association.

Mr. Maxim was a member of the Society of Automotive Engineers, the Massachusetts Fire Chiefs Club, the New England Association of Fire Chiefs and the International Association of Fire Chiefs. He is survived by his wife and a son.

Firemen Tour Aluminum Plant

A four-day familiarization program for Baltimore County fire fighters was completed this week by Kaiser Aluminum at the Halethorpe, Md., Extrusion Works. Designed to acquaint the officers and men of area fire companies with the plant, the program was conducted by J. S. King, chief of plant protection for the company.

A total of 50 men from the Catonsville and Halethorpe, Md., fire stations, under the command of Battalion Chief Austin Dietz of the Western District, toured the facility. Following the trip a detailed question and answer session was held.

Each department was reviewed to determine what, if any, emergency situation might develop in that particular area. Remedies and solutions to these possible emergencies were outlined at the site.

The Baltimore County Fire Department is thus better equipped through advance planning to deal with possible problems and familiarity with traffic lanes, cut-off valves, hose locations, etc. In addition, the crews inspected the sprinkler system and building exteriors.

Coming Events

Aug. 25-27—**New York State Permanent Firemen's Association.** Annual meeting, Syracuse, N. Y. For further information contact Robert E. Mills, Secretary-Treasurer, 420 Plymouth Drive, Syracuse 6, N. Y.

Aug. 27-30—**British Columbia Fire Chiefs Association.** Annual meeting, Victoria, B. C. For information, contact Chief F. W. Briers, 626 Cormorant Street, Victoria, B. C.

Sept. 8—**Great Lakes Association of Fire Chiefs.** Annual meeting in conjunction with International Association of Fire Chiefs, Hotel Jung, New Orleans, La. Secretary-Treasurer, Chief Elmer Stough, 605 - 4th Street, Lorain, Ohio.

Sept. 8—**Southwestern Association of Fire Chiefs.** Annual meeting in conjunction with International Association of Fire Chiefs, New Orleans, La. Secretary-Treasurer, Dr. B. J. Barrodale, 275 Gabasse Street, Houma, La.

Sept. 8-12—**International Association of Fire Chiefs.** Annual meeting, New Orleans, La. Secretary-Manager, B. Richter Townsend, Suite 1306, 232 Madison Avenue, New York 16, N. Y.

Sept. 12-14—**West Virginia State Firemen's Association.** Annual meeting, McMechen, W. Va. For information contact Edgar Gallagher, Convention Chairman, McMechen Volunteer Fire Department, McMechen, W. Va.

Sept. 12-14—**Westchester County Volunteer Firemen's Association.** Annual meeting, Briarcliff Manor, N. Y. For information, contact John R. Bailey, Secretary, Box 1, Baldwin Place, N. Y.

Sept. 13-14—**Jefferson County Volunteer Firemen's Association.** Annual convention and tournament, Alexandria Bay, N. Y. Secretary, Lewis Z. Horr, Great Bend, N. Y.

Sept. 14—**Jamestown Fire Department Association. Annual fire prevention parade.** For information, contact Martin Hagstrom, Parade Secretary, Jamestown Fire Department, Jamestown, N. Y. All fire departments are invited to participate in this parade which is the kick-off to the fire prevention program.

Sept. 16-19—**Canadian Association of Fire Chiefs.** Annual meeting, Kentville, N. S. Secretary, Chief Allan H. Clark, Fire Headquarters, Lakefield, Ont.

Sept. 16-19—**International Municipal Signal Association.** Annual meeting, Miami Beach, Fla. Secretary, Irvin Shulsinger, 120 West 42nd Street, New York 36, N. Y.

Sept. 17-18—**Iowa Firemen's Association.** Annual meeting and tournament, Chariton, Ia. For information write Secretary-Treasurer Carl H. Fuchs, 2749 Kinsey Avenue, Des Moines 17, Iowa.

Sept. 22-26—**California State Firemen's Association, Inc.** Annual meeting, San Mateo, Cal. For information, contact E. L. Albrecht, Sr., Secretary-Treasurer, 755 - 17th Street, San Bernardino, Cal.

Oct. 16-18—**Indiana Fire Chiefs Association.** Annual meeting, Evansville, Ind. For information, contact the Evansville, Ind., Fire Department.

Oct. 31-Nov. 2—**International Rescue and First Aid Society.** Annual meeting, Sheraton-Ten Eyck, Albany, N. Y. Executive Secretary, Max L. Spray, 101 North Alfred Street, Alexandria, Va.

Blue Lights for Fire Service

The use of blue lights on a vehicle in the State of New York was restricted to chief fire officials and volunteer firemen beginning July 1, 1957. The law was one of several acts affecting the fire service passed by the 1957 Legislature.

The same law permits fire chiefs, county fire marshals, county fire coordinators and their deputies to exceed the speed limits on their way to fires but does not grant the same immunity to firemen answering alarms in their own cars.

Safety Equipment

A PLUNGER CANS

Insure plant and operator safety in all cleaning, sponging and swabbing operations. When plunger is depressed a measured amount of the volatile and flammable fluid rises into the dasher to moisten the swab Excess liquid flows back into the can and is not left on surface to evaporate or be ignited Dasher containing fire baffle is self-extinguishing. Five sizes from 1 pt. to 2 gal.

B SAFETY CANS

For general use wherever flammables are employed within the plant. Fire prevention baffle is a double concentric cylinder inside base of spout Spring-loaded cap automatically makes tight closure. Squeeze-grip handle; positive control while pouring

C BENCH CANS

Reduce waste, speed production and give positive protection against fire and explosion. The spring mounted perforated metal dasher which also acts as the fire baffle covers the liquid surface and minimizes evaporation losses. A size to meet every requirement.

D OILY WASTE CANS

A necessity in every plant for the safe placement of oily or solvent-soaked rags and other waste material. Required by many insurance companies. Full length cover opens wide by slight foot pressure at any point on full width treadle.

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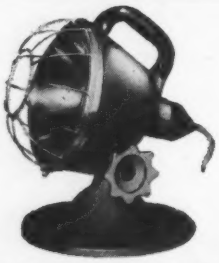
Rugged, weatherproof, sealed beam lamp, light weight only 6 lbs. compact 11" high, 9" dia. base. Wired complete with twist lock connector.

No. 150M R-60 FLOODS, 750 or 1000 Watts.

Same basic construction as No. 150, except light designed for larger capacity lamp.



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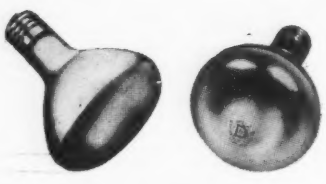
Same rugged construction as the 150 series, only lamp housing designed to use the Par 56 sealed Beam rim mounted lamp. 9" dia. base, weight 5½ lbs.



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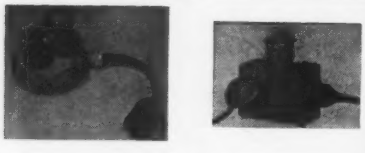

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FIRE COLLEGES

Arizona State Fire Training School—Oct. 17-19, Phoenix. Director, Battalion Chief Jake Siken, Fire Fighting Instruction Supervisor, 49 South First Street, Phoenix, Ariz.

Florida State Fire School, Sept. 9-13—**Units 101,** Tools, Forcible Entry, Breathing Apparatus; **107,** Arson Detection; **208;** Fire Department Administration, Sept. 16-20, **Units 102,** Hose and Ladders; **106,** Fire Inspection; **204,** Fire Fighting Tactics. Sept. 23-27, **Units 103,** Rescue, Ventilation, Salvage and Overhaul; **105,** Fire Apparatus and Pumps; **206,** Fire Prevention and Protection. Sept. 30-Oct. 4—**Units 104,** Fire Streams; **201,** Instructor Training; **202,** Company Officer Training. Director, W. H. Barnett, P. O. Box 785, Ocala, Fla.

Indiana State Fire School—Sept. 10-13, Purdue University, Lafayette. Director, Professor Shelby Gallien, Public Safety Institute, Purdue University, West Lafayette, Ind.

Kansas State Fire School—October 21-24, University of Kansas, Lawrence. Director, Clyde A. Babb, 111 Fraser Hall, University of Kansas, Lawrence, Kans.

Maryland Fire College, Annual Short Course for Firemen—September 3-6. For information, contact Robert C. Byrus, Director, Fire Service Extension, College of Engineering, University of Maryland, College Park, Md.

Michigan Fire Inspectors Conference—Sept. 24-27, Kellogg Center, Michigan State University, Lansing, Mich. For further information, contact Phillip K. Alber, Secretary-Treasurer, Michigan Fire Inspectors Society, 732 West Genesee Street, Lansing, Mich.

Morris County Fire School—Sept. 3, Cedar Knolls Fire Headquarters, Cedar Knolls, N. J. For information, contact Robert H. Wright, Publicity Chairman, Long Hill Lane, Chatham, N. J.

New Jersey State Fire College. Fall outdoor training sessions—Sept. 12-15 (tentative), Sea Girt. Director, Deputy Chief (ret.) John P. Weeks, 804 Quackenbush Boulevard, Sea Girt, N. J.

New Mexico Fire Marshals Fire Protection Conference—Aug. 21-23, Roswell; Aug. 25-27, Las Vegas. Director, John B. Woodall, Deputy Fire Marshall, P. O. Box 311, Santa Fe, N. M.

Ohio Short Course for Arson Investigators—Sept. 16-20, Ohio State University, Columbus, Ohio; For further information, write Willis S. Peterson, General Chairman, Room 613, Wyandotte Building, 21 West Broad Street, Columbus 15, Ohio.

Ohio State Fire School—Sept. 9-13, Ohio State University Campus, Columbus, Ohio. Director, Dr. Harvey Walker, Department of Political Science, Ohio State University, Columbus. Co-Director, Wayne C. Jenkins, Chief of Fire Prevention, State Fire Marshal's Office, Wyandotte Building, Columbus, Ohio.

Pennsylvania State Fire School—Apr. 29-Oct. 4, three seven-week cycles of fire fighter training. All at Pennsylvania Fire School, Lewistown, Pa. For information, contact Art Espey, Director, Box 631, Lewistown, Pa.

Virginia State Fire School—Sept. 9-13, No. 9 Station, Thole Street, Norfolk. Director, R. Lawrence Oliver, Supervisor-Instructor, Fire Service Training, P. O. Box 654, Harrisonburg, Va.

Western Pennsylvania Firemen's Training Institute—Aug. 19-23, State Teachers College, California, Pa. For information, contact James Silbaugh, Secretary, Fire School Committee, Uniontown, Pa. □□

Persons in the News

T. W. Heidner Chief at Pasadena

T. William Heidner has been named chief of the Pasadena, Cal., Fire Department to succeed Chief S. H. Edmondson who retired.

Chief Heidner joined the department in 1936, was promoted to engineer in 1942, to captain later that same year, to assistant chief in 1942 and to first assistant chief in 1955.

He has helped organize the fire fighting forces at Caltech's Jet Propulsion Laboratory and has been chairman of the Los Angeles Chapter and a Southern California section of the Governor's Safety Conference.

James Kane has been named first assistant chief. He has been with the department for 15 years. He was promoted to captain in 1946 and to second assistant chief in 1955.

Moody Named Marshal

Chief John J. Moody, St. John, Mo., has been named to the newly created position of fire marshal of St. Louis County, Mo. Chief Moody has been commanding officer and fire marshal of the Community Fire Protection District since 1954.

He will have responsibility for enforcing safety codes in unincorporated areas of the county and in communities contracting for such service. His appointment was made following inspections of nursing homes by the county as a follow-up of the Katie Jane Memorial Home disaster at Warrenton in which 72 persons died.

Chief Augustine Retires

Assistant Chief Wesley H. Augustine, senior member of the Los Angeles City Fire Department, retired May 2 after nearly 48 years of service. Chief Augustine joined the department on September 1, 1909, when the city had less than 300,000 persons and saw it grow to a metropolis of nearly 2,500,000. No other fireman in the current history of the Los Angeles

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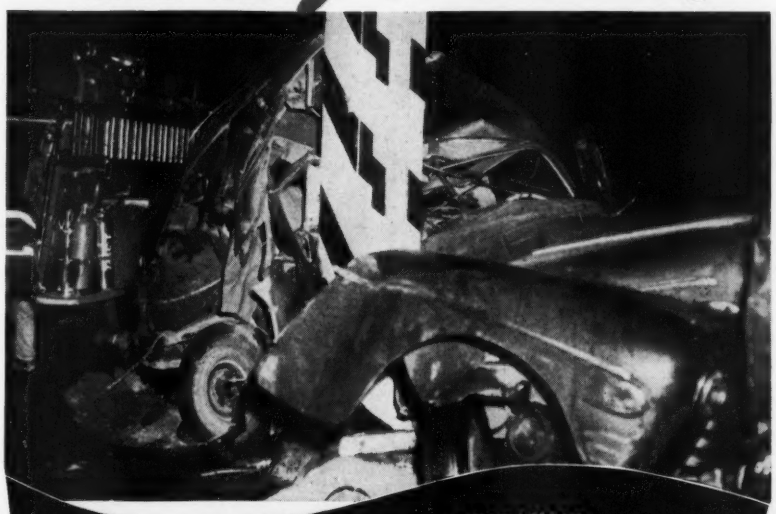

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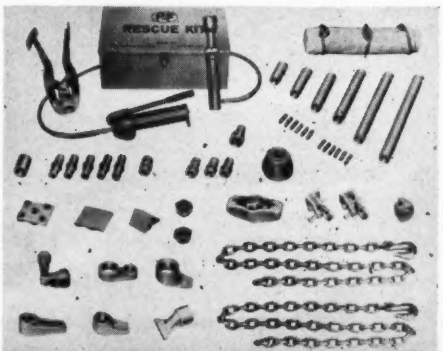

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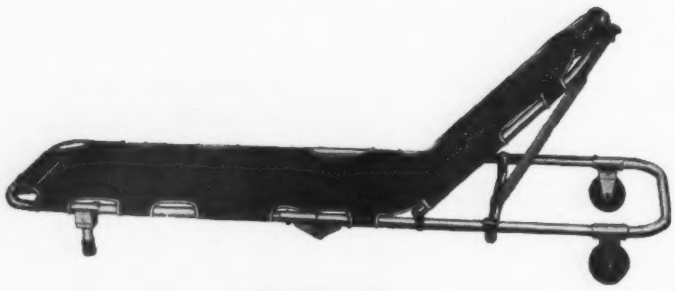

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Fire Department had as much service in years as Chief Augustine.

Until recently, he had been in command of Division 1 which embraces the vital harbor areas, oil fields and the L. A. International Airport. He has two sons, Captain Paul Augustine and Eugene Joseph Augustine, on duty with the department. *Cliff Dekter*

Marion Fire Chief Honored

Tribute was paid to the long and devoted service of Fire Chief Owen A. Sifritt on May 21, by Marion, Ohio, civic leaders and his fellow firemen at a banquet commemorating the chief's 50th anniversary in the Marion Fire Department. He was hailed for his courage, leadership, enthusiasm and resourcefulness, as well as his devotion to duty for a half a century.

Congratulating Chief Sifritt and presenting him with life membership in the International Association of Fire Fighters and bonds, are (left to right): John J. O'Doherty, Lorain, Ohio, trustee of the International Association of Fire Fighters, who served as toastmaster; Chief Sifritt; James Bradshaw, president of Local 379, AFF; Rex Kilbourn, chairman of the fire prevention committee of the Chamber of Commerce

In addition to accolades from the many men with whom he worked, Chief Sifritt was presented with a gift and a lifetime membership in the International Association of Fire Fighters—the first such award ever made by the group. Some 200 firemen, civic leaders and friends of the chief attended the dinner in his honor.

All members of the Marion Fire Department were able to attend the banquet, thanks to the cooperation of the Marion Police Department which stood by during the dinner to intercept any alarm. All Marion fire trucks were stationed around the hotel in case of a fire call. *James W. Bradshaw*

FCC Changes

President Eisenhower has appointed John C. Doerfer, FCC Commissioner since 1953, to replace Commissioner George C. McConnaughey who retired as chairman on June 20 last. At the same time he nominated Frederick W. Ford, Assistant Deputy Attorney General, to succeed to the vacancy on the commission. Mr. Ford is a former FCC staff member and since 1953 has been with the Department of Justice.

Floyd Baker of Bean Retires

Retirement of Floyd F. Baker, veteran fireman and training instructor, as director of fireman's training school since 1947, has been announced by the John Bean Division, Food Machinery and Chemical Corp., Lansing, Mich.

Chief Baker has had an extensive career in fire fighting. From 1913 through 1943, he served as chief of the Highland Park, Mich., Fire Department, interrupted only by a two-year hitch in the U. S. Navy in World War I. From his retirement from that department, he joined the Michigan Office of Civil Defense, remaining there until 1946. He joined John Bean a year later.

Hoegh Heads Civil Defense

Former Governor Leo A. Hoegh of Iowa was sworn in on July 19 as Federal Civil Defense Administrator. He succeeds Val Peterson who was appointed Ambassador to Denmark by President Eisenhower.

The new administrator took over the reins of the federal agency as a nationwide CD test, "Operation Alert" drew to a close. During the mock drill he had been an observer at the Battle Creek, Mich., headquarters as Deputy Administrator Lewis E. Berry directed the drill.

Moser Joins Indiana Marshal

Chief Bert Moser, Bluffton, Ind., has accepted appointment as educational director with the Indiana State Fire Marshal's office. His duties will take him to every part of the state in educating fire departments in fire fighting and prevention procedures.

Chief Moser is president of the Indiana Volunteer Firemen Association and a member of the advisory board on fire fighting at Purdue University.

New Orleans Fire Advisors

Mayor deLesseps S. Morrison of New Orleans has appointed Elliot G. Conkling and John W. Bowen to one-year terms on the city's fire advisory committee. The mayor also announced the reappointment to the committee for one-year terms of L. Torrey Gomila, State Senator Theodore M. Hickey, H. Frellsen Page, Oscar B. Hamilton and O. P. Villarrubia.

Chief Zado Retires

Chief August Zado of the East Detroit, Mich., Fire Department retired on July 1, 1957. He had served as chief since 1938. He is a member of the International Association of Fire Chiefs.

Lund Chief at Stow, Mass.

James Lund, a member of the Stow Fire Department for the past 17 years, has been appointed chief. He succeeds Harold J. Priest who retired after serving the department for the past 22 years, the last 17 as chief. *Henry T. Hanson*

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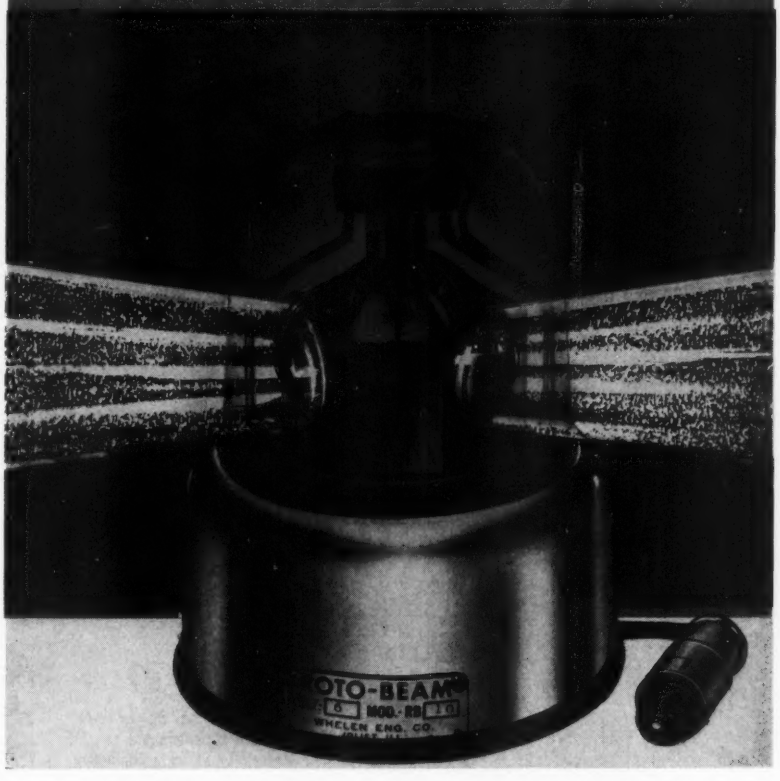
360° ROTATING BEACON LIGHT



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THE WATCH DESK

overhauling the firemanic news of the day

"Hot Front" Moves in

There have been a number of brief items in these columns concerning the fire hazard of 'falsies.' Some of the Brothers (and their better halfs) have scoffed at these "old wives tales." Now comes irrefutable evidence—which we print for the record.

It is from Berkeley, Cal., and the news clip' said: "Spontaneous Combustion! Falsies Afire. . . ." It read: "A bra with built-in falsies started a fire in a Berkeley launderette, yesterday and it was no false alarm."

The bra's foam rubber trappings ignited while in a gas dryer at a launderette. The proprietress saw smoke pouring from the dryer as fire spread from the blazing bra to other clothing.

She attempted to extinguish the flames and finally ran to a neighboring shop for help. Someone called the fire department and 12 men and five pieces of equipment responded.

Assistant Fire Chief G. Rodney Porter estimated damage at $100 and sent charred specimens of the flammable bra to the fire prevention bureau for analysis.

"It's no joke," said the proprietress, "My beautiful new dryer needs fixing and I guess about 20 pounds of clothes are burned. Besides, the girl who brought that bra was very indignant. She tried to tell me it couldn't have been hers because she never wears falsies."

Ever See a Tree Puffing?

A housewife of Little Rock, Ark., didn't know what to think when a mulberry tree in her backyard appeared to have smoke puffing out of its branches.

Her name is Mrs. Verdia Brown and she watched the phenomenon long enough to be convinced the tree was puffing smoke in wisps like a person exhaling cigarette smoke.

So she thought for verity's sake, if nothing else, she ought to call some witnesses. She started with a patrolman —Gene Adcock—who told her, "I would call the newspapers. Somebody else ought to see this thing." (How come she failed to call the F. D.?)

And so, a breadman, a milkman and a photographer all came, for to look and for to see, and went 'round the smoking mulberry tree.

Furthermore, State Forester Fred Long came and took a good look. And he, too, was unable to say definitely what caused the smoke-like wisps emitting from the branches.

There the matter stands — and the smoking mulberry tree. Pretty soon, somebody's gonna ask the fire department to get busy and solve the riddle.

Ah Radio!

In Detroit, Fire Chief Edward Blohm was motoring downtown June 5 last, when he spotted smoke pouring from atop the Clofford Hotel.

It was a simple matter to pick up his 'mike' and transmit an alarm to headquarters, meanwhile dispatching his aide, Fireman Richard Woodmansee, to go to work on the fire with extinguishers which the vehicle carried.

The Chief followed along and he and his aide did a neat job of holding the blaze until companies arriving on the "still" alarm could wind it up.

Just a bit more evidence of two things: (1) Value of radio and (2) of portable extinguishers on even the big boss' fire vehicle.

Communications Interrupted

While firemen were answering an alarm in Atlanta, Ga. a thief entered one of the fire stations and stole a radio receiver used to monitor police calls. Local police are searching for the equipment and the culprit.

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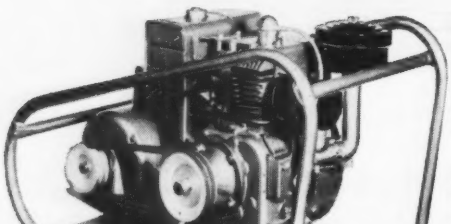

MODEL SS-3990 Belt driven—mounted on tubular steel skid for added protection—provides easy handling.

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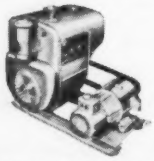
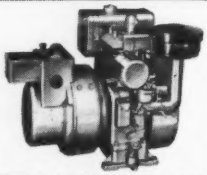
MODEL BHA-20L Compact electric plant. Rugged, lightweight for easy portability. 2500 watts AC, 115 volts AC, 200 watts DC, 15 volts DC, 60 cycles, 1 phase, 3600 RPM.



MODEL SS 4218 Belt driven—mounted on heavy steel skid base. 23 HP engine, develops 12,000 watts—120/208 volts, 3 phase.



MODEL BA 10 Compact electric plant. Rugged construction. Develops 1,500 watts AC, 115 volts AC, 200 watts DC, 15 volts DC, 60 cycles, 1 phase, 1,800 RPM.

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Novel License Plate

There's no question as to the identity of the private car owned by Howard G. Reynolds, chief of the Eagleville, Conn., Fire Department. Instead of the regular number plates, Chief Reynolds' markers bear the word "FIRE." It is the only car in the United States that bears plates of this type, as Connecticut is the only state where automobile owners are al-

lowed by law to secure "initial" markers, but only four letters are permissible. Chief Reynolds secured the "FIRE" markers when he returned from the service in 1947. He is president of the Connecticut Fire Chiefs' Association, and past president of the Windham and Tolland County Firemen's Association, and served for many years as a county vice-president of the Connecticut State Firemen's Association.

Tom Magner

The Show Must Go On

In Central City, Ky., Mrs. Lee Forkum proved that she could take it.

Mrs. Forkum is a performer working with her husband at drive-in theatres and the like. In the particular bit number which provides the basis for this yarn, she was supposed to be placed in a box and blown up by dynamite—but left uninjured and untouched.

Well, something went haywire, and the four sticks of dynamite blew her right off the truck bed, which was substituting for a stage, and knocked her unconscious.

She was rushed to a hospital where she regained consciousness—and got up and returned home. She plans to go right on with the act. Faith! It's wonderful!

Incendiary Sparrow

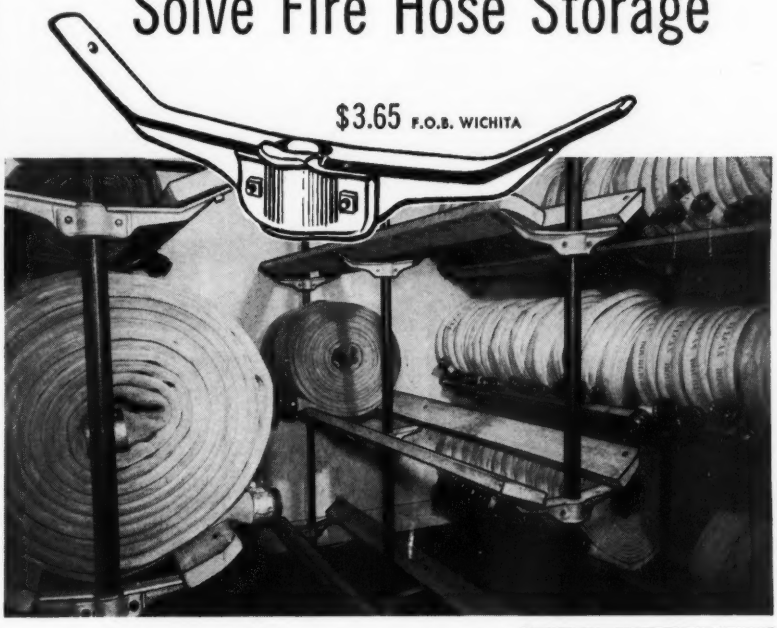
A sparrow was officially blamed for a fire that ruined its own nest and the awning of a branch library in Brooklyn on June 11. Engine 276 extinguished the flames before more serious damage was done.

Firemen concluded that a sparrow, like some mortals, had been careless about cigarette butts. Apparently it had picked up a cast-off cigarette to weave into its nest. The cigarette was not quite out and the nest made excellent tinder; soon the awning was on fire.

The unintentional arsonist apparently has not returned to the roost. Brooklyn firemen and police are hoping that the next time the sparrow plays with fire, the bird will have the courtesy to turn in an alarm.

BRACKETS

Solve Fire Hose Storage



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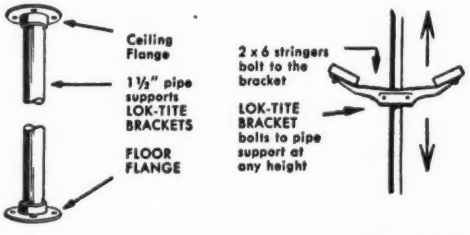
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LOK-TITE BRACKET bolts to pipe support at any height

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- Simple to install
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APPARATUS SURVEY

Continued from page 764

A total of 44.5 per cent of the chiefs responding stated they could see no advantage in the use of such equipment while 41.3 per cent were definitely in favor of adopting it; 14.2 per cent were undecided or made no comment.

One chief explained that he had taken a poll among the members of his department to ascertain their opinions. It is interesting to note that all of the officers of this particular department were opposed to torque or automatic transmissions, while the privates favored it unanimously. Chief Hugh F. Morris, San Mateo, Calif., is one of the fire officers who believe that some type of converter or automatic transmission must be used in the near future. He bases his opinions on the fact that many men now coming into fire departments have never been required to use a conventional shift transmission in their personal automobiles. He is at present faced with the situation and reports he finds it difficult to teach new drivers the proper use of truck transmissions.

A few manufacturers are presently offering torque converters for use on fire apparatus and nearly all will supply it on special order. At present the most serious drawback appears to be the high cost. It is possible this problem will be overcome in the near future as production is increased.

Motors a popular subject

Perhaps the subject most discussed in fire fighting circles, with the possible exception of pumps, is that of motors or the apparatus power plant. Nearly every fireman at some period of his career develops a preference for engines. Many enthusiasts love to express their sentiments on their pet power plant and its advantages over other types and makes. The questionnaires reflect much of this tendency.

The largest number of chiefs (15 per cent) were quite satisfied with the engines they are presently using and felt no improvement is needed. Another group (10 per cent) took the position that present engines were not powerful enough and should have increased horsepower in the future.

Still others contended that engines should be simplified in order that maintenance problems may be more easily solved. A number stressed a wish for lighter weight and easier access to mechanical parts for improving maintenance. Some specifically included the pump in this category and expressed a desire for apparatus design that would permit better access to both engine and pump.

An improvement in present carburetor systems was asked for by some respondents and an equal number suggested that the carburetor be discarded entirely and fuel injection systems substituted.

Some chiefs advocated the use of engines other than the conventional gasoline style—a few specifying diesels as a satisfactory solution. Chief D. G. Higgins, Huntington Beach, Calif., is one such chief. He stated he might change to diesel engines if they are adapted to fire service use. He suggests that a pancake-type diesel, placed under the frame in the manner of school or transit buses, might be the answer to the problem of keeping size within practical limits.

Other officers reporting expressed the belief that engines capable of operating on liquefied petroleum gas might prove best for the fire service; one suggested that an arrangement be supplied that would allow starting and running on LP gas but with a switch-over system for using gasoline on long pumping stands. It is true that some of the engines now used in the fire service can be operated on LP gas with only minor changes in the engine. Fueling systems would naturally be somewhat different than those presently used.

A few chiefs mentioned the turbine engine as a possibility for the future.

Suggestions advanced

Some of the suggestions made for improvements include:

Build in block heaters to prevent cold starts

Equip engines with gauges to measure oil viscosity

Improve oil filters

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No-spin differentials

Tires produce comments

In 1937 Robert H. Lockwood reported in FIRE ENGINEERING that the advent of the pneumatic tire was probably one of the most important advances made since the inception of motor apparatus, but that its advent created great controversy among fire chiefs. At the time of introduction many chiefs believed that such tires could not be relied on for fire service use and were too risky (FIRE ENGINEERING, Oct. 1937).

Great strides have been made in the tire industry since those early days and today these products are more or less taken for granted. At the present time, new ideas are being offered by tire engineers and it is conceivable the entire tire picture may change in a matter of a few years.

A comparatively new development in the truck field is the tubeless tire. A total of 14 per cent of the questionnaire returns reported such tires were favored if available for fire apparatus. Several chiefs mentioned that such tires are now used on department cars, station wagons, etc., and one department uses them on an ambulance with the addition of safety shields.

All-weather treads or those suitable for mud and snow are very popular and are favored by 71 per cent of all chiefs reporting. The use of such treads on the rear wheels of fire apparatus is common practice, but a few chiefs mentioned their use on front wheels as well.

Sanders and undercoating

In conjunction with tires and all-weather operation, the use of sanders was approved by 29 per cent of the respondents. For the most part these replies came from departments in the cold weather belt. Many chiefs located in the warmer climates felt they were unnecessary for their operation.

Undercoating of fire apparatus was favored by 40 per cent of those queried, although some questioned its value in the fire service. One chief emphatically stated he considers it good practice to clean underneath the apparatus as well as the visible exterior. He believed that if this is properly done then additional protection of undercoating is unnecessary.

Views on electrical systems

Directional signals on vehicles are required by law in many states without any exemption for fire apparatus. Perhaps

"IT ALL STARTED WHEN THEY HEARD WE HAD BOUGHT LIGHTWEIGHT, EASY HANDLING HEWITT-ROBINS 'DACRON'* FILLER HOSE."

*DU PONT T. M.

Hewitt-Robins manufactures all types of Municipal and Industrial Fire Hose

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this explains (as some chiefs indicated) why 92 per cent of the chiefs considered they should be included on apparatus. It is disclosed by some respondents that many departments use the signals in a normal manner when responding to alarms, but when the apparatus is positioned at the scene, the directional signals are then switched to a special warning circuit and thereafter operate continuously, either flashing or constant.

Alternators or high output generators are favored by 84 per cent of the respondents. In addition to handling with ease the ever-increasing electrical load imposed on the vehicle's system by the expanded use of radio, flashing lights, etc., a total of 61 per cent of the chiefs mentioned that a noticeable drop was recorded in the required station charging of apparatus batteries when alternators are used. Typical of the comments was that of Chief Jacob A. Jessup, Sunnyvale, Calif., who stated, "Only one piece of our apparatus is presently equipped and we have noticed a remarkable drop in the amount of charging required on the batteries of this apparatus." Another interesting related sidelight came from Chief Ken Hickey, Multnomah County Fire Department No. 2, Oregon, who reported, "Alternators are essential for home inspection programs so that engines may idle and not discharge the batteries."

Many chiefs mentioned they preferred the alternator system because of the possibilities of obtaining additional electrical current for operating lights and small tools in the vicinity of the apparatus when on a fire or emergency call. By means of a transformer-rectifier circuit and a weatherproof plug outlet, it is possible to provide for the direct connection of lighting equipment and other D.C. or universal A.C.-D.C. motor-operated tools up to the power limits of the circuit. This method is a very handy supplement to the standard portable generators carried by most departments.

Storage batteries were discussed freely by most responding chiefs. The most popular type mentioned is still the standard, heavy-duty, lead-acid battery but some departments are experimenting with nickel-cadmium types. Proper care of batteries was stressed by many chiefs as the secret of better operating life. Several departments which maintain extensive shops mentioned that they have facilities for constructing and rebuilding their own batteries.

Apparatus color

When asked to comment on apparatus color, 83 per cent of the chiefs said red was most desirable. A considerable number went further and voiced the sentiment that legislation should be enacted to reserve a standard color for the fire service.

The color white is preferred by 8 per cent and 5 per cent said they were not particular but preferred some color other than red.

Replaceable hose beds

Several chiefs advanced the possibility of using removable hose beds on apparatus on the theory that a spare loaded bed could be held in readiness at the fire station and placed on the pumper when it was returned to quarters following a fire. This would return apparatus to service very quickly and would eliminate the handling of hose at a time when the men might be fatigued.

In addition, the plan offers advantages for areas where forest and brush fires are a periodic problem. Experiments have already been conducted with helicopters which lift the entire hose bed from a pumper and transport it to an otherwise inaccessible location for use by men previously assembled by helicopters or other transport.

Whither the station wagon

An interesting trend which concerns one particular type of fire department automotive vehicle is disclosed by the survey. This relates to station wagons, for many years a stepchild of the fire service.

From a sort of general utility rig, the station wagon has emerged as a definite entity in many fire departments, being widely used as rescue and emergency units.

Of the many fire departments which answered the questions concerning station wagons, over 34 per cent of them said they were considering their use,

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Fire Chiefs Everywhere...

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while 20 per cent of them replied they were presently in service.

The returns quite conclusively place the station wagon in the apparatus field, as well as in the general utility and passenger car category. □□

Exhibitors at I. A. F. C. Conference

Chief L. C. Canning of Midvale, Utah, chairman of the exhibit committee, has announced that 74 exhibitors have taken space at the New Orleans conference of the International Association of Fire Chiefs, September 8-12. Chief Canning says, "Once again it looks like we will have a new record in exhibit spaces."

The complete list to date follows:

Akron Brass Mfg. Co., Inc.
American City Magazine, The
American District Telegraph Company
American Fire Apparatus Co.
American Fire Pump Co.
American LaFrance Corp.
Ardmore Products Div., The Amco Corp.
Baker, J. M., Pattern Co., Inc.
Bartow Laboratories, Inc.
Blackhawk Mfg. Co.
Blackinton, V. H., & Co., Inc.
Bomgardner Mfg. Co., The
Boston Woven Hose & Rubber Co.
Chevrolet Motors Div., General Motors Corp.
Chiksan Co.
Circul-Air Corp., The
Cornelius Company, The
Dictaphone Corp.
DuPont de Nemours, E. I., & Co., Inc.
E & J Mfg. Co.
Eagle Signal Corp.
Electronic Protection, Inc.
Elkhart Brass Mfg. Co., Inc.
Encyclopaedia Britannica, Inc.
Eureka Fire Hose Div., U. S. Rubber Co.
Fabric Fire Hose Co.
Federal Sign & Signal Corp.
Fire Engineering
Ford Motor Company
Four Wheel Drive Auto Co.
Fyr-Fyter Div., Fyr-Fyter Co.
Gamewell Co.
Goodall Rubber Company
Goodrich, B. F., Co.
Hale Fire Pump Company
Hall-Scott, Inc.
Hannay, Clifford B., & Son, Inc.
Hewitt-Robins, Inc.
Higgins, Thomas M., Company
Kidde, Walter, Sales and Service of Louisiana
Kohler Co.
Lavingne, Donald S., Inc.
Leece-Neville Co.
Lee-Dee Manufacturing Co., Inc.
Mack Fire Apparatus
Mars Signal Light Co.
Maxim Motor Company
McIntire, F. N., Brass Works, Inc.
Memco Aerial Ladder Co.
Mine Safety Appliances Co.
Motorola, Inc.
National Cylinder Gas Co.
Notifier Corp.
Onan, D. W., & Sons, Co.
Orthopedic Frame Company
Pirsch, Peter, & Sons, Co.
Phonalarm Div., Angelus Industries
Powhatan Brass & Iron Works
Rich Co., Inc.
Safety First Products Corp.
Santa Rosa Fire Nozzle Company
Scott Aviation Corp.
Seagrave Corp.
Simpson, William, Sons & Co., Inc.
Sireno Co., Inc., The
Southern Bell Telephone & Telegraph Co.
Stephenson Corp.
Stevens, J. P., & Co., Inc.
Superior Coach Corp.
Super Vacuum Manufacturing Co., Inc.
Trilling, Emanuel
Ward LaFrance Truck Corp.
Washington Products Co.
Wooster Brass Div., Fyr-Fyter Co.

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SUPERVISING ENGINEER

Continued from page 782

Before leaving the scene of any fire, a final check is made by unit personnel of the apparatus in operation. To prevent unnecessary tieup of vehicular traffic, a survey is made of hose lines and where advisable, these as well as pumpers, are shifted to open up thoroughfares. A final report is then made to the chief in charge and the unit returns to quarters.

Dewatering

Every metropolitan fire department is called upon at some time to assist in dewatering buildings, underpasses, etc., with resultant complications which may imperil men or apparatus. This task of supervising such details usually falls to the lot of the supervising unit. Such was the case when New York City's fire commissioner and chief of department heeded the call for assistance from flood-stricken Danbury, Conn., a year ago. In this emergency the unit's personnel supervised the mechanics of the entire lengthy dewatering operation.

Probably the most protracted and extensive dewatering job ever undertaken by a fire department was that involving the Wanamaker Building and Manhattan's subways a year ago. The supervising engineering unit was up to its Plimsoll mark, literally and figuratively, in this operation which saw the removal of over 81 million gallons of water and the inundated subways restored to service.

Building collapse

Any building collapse, whether as a result of fire, explosion or other causes, usually involves technical problems of coping with gas, water and electricity, and their possible bearing upon the rescue of persons. Here, also, the unit may be called to utilize its special facilities and talents. This was demonstrated in the memorable Amsterdam Avenue tenement collapse of 1947 which took 37 lives. The unit's personnel operated with members of fire and other rescue units for many hours.

Special post-fire tests

Frequently explosive fires and other emergencies call for post emergency tests and experiments, such as checking on water flow and injuries to standpipe and related extinguishing systems. This is another field in which the supervising engineers may be called in. This occurred following the Holland Tunnel fire of some years ago, when hydrostatic and flow tests were run on the tunnel's standpipe system. As a result of disclosures, a new operating procedure was formulated to fight any future similar fires in the shaft.

Many miscellaneous tasks

Over the years the unit has functioned in many other activities, including such details as testing various departmental equipment and new inventions; directing various relay operations; filling a swimming pool in the upper stories of a settlement house; restoring heating plants to operation; isolating breaks in water supply systems and assisting in bridging such breaks; participating in Civil Defense operations, etc.

In looking back over the number and variety of the tasks performed, one recalls the statement of a top official of the department in discussing the unit's expanding work load: "They're jacks of all trades—and masters of them, too." □□

The second part of Captain Ryan's article will appear in an early issue.

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Tree Sprayer Saves Barn

Luther Group was repairing a tractor in the barn of his farm near Gardners, Pa., recently. A spark ignited some gasoline he was using which flared up and ignited his clothing. He ran from the barn, removing his clothing on the way to his house.

His 15-year-old son, Stanley, ran into the yard and drove a tree sprayer into the barn. He then sprayed the blazing floor and some crates. Benderville and Aspers firemen who responded to the fire call said the prompt action of the youth limited the damage to an estimated $100.

Continued from page 767

the occupancy from which the supply is drawn, and this in turn may lead to complications. It is well for a fire department to anticipate such situations and prepare for them accordingly.

When it is necessary to meet any considerable demand for power at the scene of an emergency, or to provide it in time of municipal power failure, the individual heavy-duty movable power plant (as distinct from the smaller, lighter, portable units described later on) may be highly valuable. Its capacity may vary with the estimated demands upon it and the need for maneuverability, but it should be able to generate up to 3,500 watts output.

Such equipment is not always inventoried and operated by municipal fire departments but may be secured through other municipal agencies, such as civil defense, public works department and so on. These standby units should be available to every department.

To insure most efficient operation of these sources of supply, provision should be made for the necessary cable and connectors. A power-generating plant of whatever kind, without requisite cable is as useless as a pumper without hose.

The "big little" generator

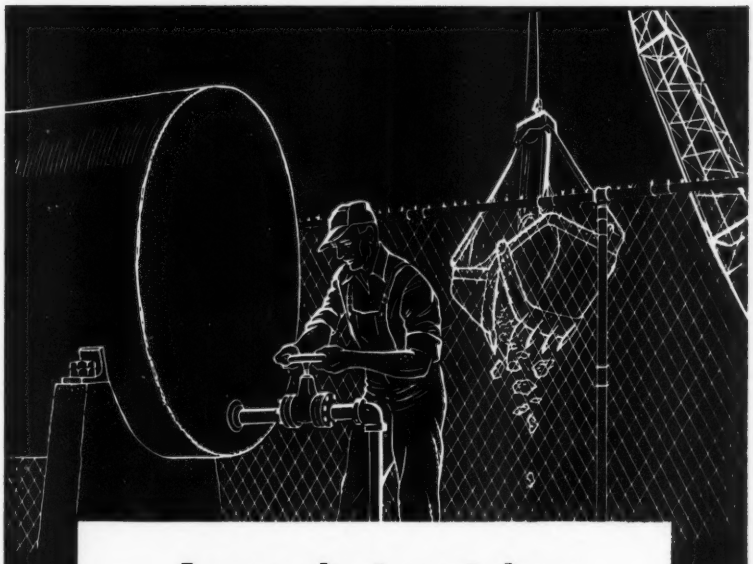
This brings us to perhaps the most popular and widely used of all the electric supply sources, the portable power generator.

Originally designed to provide current for flood and spotlights, the portable generator has been continually improved, both in its bulk and its power output, so that it has become the ideal source of energy for operating many of the tools and devices now finding favor with fire fighters for forcible entry, rescue, opening up for ventilation and overhauling.

There are two methods of utilizing the portable generator. Both have advantages. The first is to rig it in a compartment, or on the running board or other accessible place on the fire apparatus, so that it can be used as a semi-permanent auxiliary power unit of the vehicle. It is generally customary to carry this semi-permanent mounting on a ladder truck because this vehicle is usually nearest the point of use. As said, the mounting can be such that the device can be quickly removed, to become a fully portable power plant. Installed on the apparatus, it is possible to control the starting from the driver's seat; the cable leads can be connected directly to the generator on the rig, and stretched to where the light or the power tool is needed.

Of course, there will be some voltage drop depending upon the length of the cable. If it is desired to carry the unit to areas remote from the apparatus, thereby reducing the leads to the minimum, this is easily possible.

So important has the portable power generator become that at least one unit is now being included in the specifications of nearly every aerial ladder on order as well as being standard equipment



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on many pumpers and other fire department vehicles. The multiplicity of uses, both for providing power for fire control and rescue operations, and for furnishing emergency lighting, warrant liberal investment for such fire department assets. Their use in disasters such as flood, hurricane, train wreck, building collapse, is limitless. Most fire chiefs reporting to FIRE ENGINEERING list these units definitely as "musts."

Electric tools many and varied

The tools and appliances powered electrically are many and varied. In fact, in one department studied, the chief expressed concern over the number and variety because they were "taking up all the room on his rescue units." He reported he was seriously thinking of inaugurating a special "tool truck" which would be fitted out with all the necessary types and kinds, to respond on multiple alarms and special calls. He would equip all ladder companies with the more conventional appliances having more general application.

One of the most widely used of the electric tools is the power saw.* There are several different types, ranging from the common hand-carried circular saw widely used by carpenters in the building trades, to the labor-saving chain saws which first made their appearance in the lumber industry, and which today are found in nearly all forestry kits and generally on the rescue and emergency units of municipal fire departments.

Then there is the bayonet-type hack saw becoming ever more popular particularly in air crash and transport operations. Incidentally, the task of the fire service in safeguarding transportation on the ever-increasing turnpikes, freeways and thruways of the nation under the multi-billion dollar highway program now getting underway, will impose still more burdens upon the fire service. Modern electrical tools remove much of time and labor-consuming operational headaches attendant upon traffic and aircraft accidents. Any fireman who has used one of the powered bayonet hack saws will never want to revert to the old hand hack saw.

Although the advantage of speed alone is sufficient to justify their adoption, the neatness of the operation and the ease with which repairs can be made following the use of good power tools by a trained operator are important considerations.

* Saws are not all powered electrically. There is also the widely used gasoline-driven chain-type and the air-operated model.

Boring and breaching tools

The adoption of modern, smooth, fast-acting electric-powered drills and chippers and/or punches offer decided advantages over the ax, auger and battering ram. Cutting floor and roof openings, for example, are chores no fireman relishes, particularly when operating in heavily charged atmospheres, and upon building material that may be seriously weakened by fire or overload.

The pounding vibration of axes and mauls in the effort to open floors and roofs have brought down more than one building, with tragic results to fire fighters and salvagemen. On the other hand, the smooth, vibrationless application of the modern heavy-duty drill fitted with a special bit makes short work of piercing floors and roofs and has the added factor of greater safety. So too, with breaching and breaking walls and heavy masonry floors. The air-powered jack hammer removes many of the dangers which are always present when the old battering ram, heavy maul and sledge are used; the modern electrically operated builders' hammers still further safeguard the fireman, while doing an even more efficient job. And they do this with a minimum of effort and exertion on the part of the operators.

Other applications

Powered by the modern generator, motors sufficiently large to operate large fans are finding increasing favor with fire fighters and salvagemen for removing smoke and odors and providing fresh air. There are a number of types of air movers and smoke ejectors. There are of course, other air movers having gasoline-engine drive which find wide application.

Motor devices having larger than 1-hp imput are not operable on the generators of less than 3,000 watts output, which is about the limit of the readily portable type.

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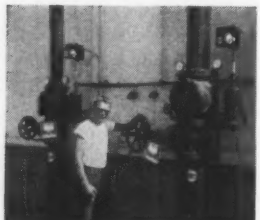

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Another indirect application is found in the field of respiratory protective equipment. With the increased use of demand-type breathing apparatus, the need for refilling air chambers has led to the development of a portable electric-powered compressor unit, which enables cylinders to be refilled and returned to service without the previous loss of time associated with returning them to commercial firms for refill.

Battery-powered devices also are finding wide acceptance in the fire service. One of these is voice amplification, widely used in area fireground operations for the control of crowds and in firemanship training. The modern electrically powered speaking trumpet may fall within the electronic category rather than the all-electrical. There is also at least one air-powered type amplifier. All have the same worthy objective, to project the voice of the speaker over incidental intermediate noises to the person or persons for whom the messages are intended.

Power, of course, also activates many of our communications devices, such as warning and alerting systems, etc.

Hydraulics—important newcomer

Many generations have elapsed since Pascal invented the hydraulic press, a machine with which he said he could multiply pressure to any extent. That principle, whereby a man could press with a force of a hundred pounds on the handle of a machine and exert a pressure of many tons, has proven a boon to the fire service.

First applied, we believe, to the raising of aerial ladders, then in lifting jacks and finally to automotive brakes, many years passed before hydraulically operated tools made their appearance.

One of the most recent newcomers to the field of such fire department power tools is the hydraulic rescue jack kit. It bids fair to be the forerunner of other similarly powered tools, designed to help speed mechanization of fire fighting and rescue.

This device is original and so outstanding in a number of ways that its description and uses deserve elaboration.

The power source of the device is a portable jack cylinder or hydraulic pump which has capacities up to 20 tons in the regular models (a special model is available having a capacity of 50 tons), yet it can easily be operated by one man.

The pump is connected by means of flexible hose to a ram which supplies the power at the working end of the tool. Various attachments are available to adapt the ram to particular applications.

The device is light, easy to carry, and all attachments may be connected easily to the power source. The flexible hose which connects the ram to the hydraulic pump permits the operator to direct the work at a distance away or very close to the scene, as the situation calls for.

The equipment can be used where it is necessary to clamp or squeeze objects together or to separate them, spread or spring them, or where heavy objects must be pulled.

It is said this tool was originally adapt-

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ed from equipment employed in auto body repair shops to remove dents and straighten folds resulting from collisions. An interesting detail of the history of this tool is the fact that several fire departments in widely scattered parts of the country were individually working to develop such a device at the same time, each without the others' knowledge.

Typical is the experience of the Minneapolis Fire Department headed by Reynold C. Malmquist, second vice-president of the International Association of Fire Chiefs. Some years ago, the Minneapolis rescue squad was dispatched to an emergency where a woman's hand was caught in a meat grinder. The squad members began cutting the grinder with a hack saw but when almost through, but still not quite far enough, the efforts had to be stopped for fear of cutting the woman's hand. Attempts to break the grinder apart were unsuccessful.

An off-duty fireman, standing by at the scene, made a search of the neighborhood to find a suitable tool to finish the rescue. He returned with a piece of equipment borrowed from a nearby garage, known as a hydraulic spread-ram. By use of this device the woman was quickly released from her predicament.

Chief Malmquist realized the value of the tool and accordingly put in a purchase request for one. Due to budget problems he was unable to secure it immediately. Within a short time a second meat grinder incident occurred with an almost identical result. Shortly afterwards the department was able to purchase one set of the tools and a local Veterans of Foreign Wars post presented a second set to the department.

Since that time the tools have found wide usage, such as releasing boys caught in retaining walls and tree crotches; freeing victims from wrecked autos following highway collisions; they have proven valuable in forcible entry work; in opening overhead doors at fires. Recently an unusual example dealt with a railroad freight car fire. The door of this car was jammed by large rolls of paper; entry was successfully accomplished by forcing it open with the hydraulic tool.

The Boston Fire Department also had a similar experience with the hydraulic tool kit. Chief Leo C. Driscoll has told FIRE ENGINEERING of several remarkable rescues accomplished by means of the tools.

An accident which occurred in a Boston housing project was precipitated by children jumping up and down in an elevator while it was in motion. The action tripped the elevator safety mechanism which in turn, prevented the doors from being opened. The doors were easily and efficiently opened by the hydraulic tool.

A second Boston elevator accident involved a young boy whose leg was caught between the floor landing and the elevator platform. Using the hydraulic tool, the elevator was pushed a sufficient distance away from the landing to enable speedy removal of the victim.

Chief Henry C. Nelson of the West Allis, Wis., Fire Department relates a typical rescue case where hydraulic tools proved their worth. A boy was pitched from the seat of a front-end loader and caught between the shovel boom and the radiator of the vehicle. The hydraulic tool was used to spread the arms of the shovel boom and release the boy.

In addition to the special hydraulic rescue tool kits, heavy-duty hydraulic jacks have proved a welcome addition to fire department tool inventories. The standard jacks are available in capacities up to 100 tons. Special high-lift models for certain uses in sizes up to 20 tons are available as well.

Some other applications of hydraulic power in the fire service have previously been noted. Recently the use of remotely operated hydraulic controls for turret and aerial ladder pipes has been encountered. Several models of hydraulic hose clamps are found in use as well as expanding machines for connecting hose couplings to fire hose. Unquestionably the future will see further devices and appliances so powered.

Compressed air

One of the original sources of power for operating mechanisms and tools was compressed air. Many years ago, certain fire officers believed that compressed air then being used in the building and wrecking trades as well as by street departments and utility companies, should have a place in the fire service.

The power source for tools of this nature is composed of a heavy-duty air

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compressor and is connected to the tools by high-pressure hose lines. It is ideal where pavement breaking and other forms of heavy wrecking or forcible entry is required. Many fire departments consider the equipment very valuable for use in extinguishing pier fires. The ease with which concrete is broken on piers and wharves has facilitated the extinguishment of fires in the wooden piling of the wharves by means of cellar pipes and distributor nozzles.

One of the first persons to apply this power principle to the fire service was the late Captain Edward Lamb of the San Francisco Fire Department. His original conception was a smoke and heat ejector or eductor. By the use of a venturi and compressed air, the movement of 10,000 cfm of atmosphere was possible with his equipment. The air compressor required for his invention also permitted it to be used to power air tools and Lamb developed a number which eventually became regular equipment on the Lamb Air Mover of the Cincinnati Fire Department. □□

REFLECTIVITY

Continued from page 779

of reflective sheeting include gold, silver, yellow, red, blue, bluegray and green. By silk screening transparent color in silver reflective sheeting, emblem or sign manufacturers can produce nearly any desired color.

Hydrants and water supply

Marking hydrants with reflective materials can make them more readily found at night, and a uniform system of coded markings can tell the fireman the water pressure or type of hydrant.

St. Paul, Minn., is one of the cities which is marking its hydrants with reflective liquid to make them easily located at night. The liquid reflects about 100 times brighter than the whitest white paint for the driver of the approaching vehicle. During the day it looks like an ordinary gray stripe. It does not glow in the dark—it can be seen at night only from the motorist's position behind the headlights of the approaching vehicle.

The hydrant is marked by stencil—either painting or spraying. Each hydrant takes less than a minute to mark.

Some cities and counties mark their hydrants with reflective taps, using different colors to signify water pressure. Thus, the fireman can tell day or night the type of hydrant he's approaching, and the colors reflect brightly at night to mark the hydrant as well as identify it.

Firemen who so mark hydrants should adopt the marking code of the National Fire Protection Association, the National Board of Fire Underwriters and the International Association of Fire Chiefs, i.e., green to indicate flow of 1,000 gpm or over; yellow to indicate 500 to 1,000 gpm and red to indicate less than 500 gpm (and dead end). Many metropolitan cities designate the size main on which the hydrants are located by numerals

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on the barrel of the hydrant. This also can be done with reflective material.

Another use for reflective indicators is either on signs or posts to show where wells or sunken hydrants may be located. In some locations where snowfall is heavy, posts indicating hydrant locations are used. These may be treated with reflective material to enable snow-covered hydrants to be quickly spotted at night.

Reflectivity is also aiding fire departments in reaching the scene of the emergency rapidly.

In urban areas, many cities are utilizing reflective street name signs which not only permit drivers to read the name of the street they're approaching without slowing down—again by reflecting the headlights of the approaching car—but also mark intersections in unlighted sections of the city.

Reasons given for the installation of these street name signs, which are reflectorized by surfacing them with reflective sheeting, include enabling emergency vehicles—fire, police, ambulance—to find their destinations in the fastest possible time; they provide a smoother flow of traffic for motoring safely, since motorists need not slow down to read them at night; they mark the intersection for the motorist when he's more than a block away in areas yet unlighted. They also mark dangerous passages and dead ends.

As has been described in previous issues of this journal, some rural areas have undertaken a house-sign reflective marker which is placed near the road to enable emergency vehicles, primarily fire departments, to identify rapidly the location of the emergency.

Various numbering or lettering systems are used, one technique being to assign each road a letter, and each house a number. The resident erects a sign—reflective to permit rapid location at night—with his identifying letter and numeral. The sign is erected on the road near the driveway or entrance road to the property.

In case of emergency, the caller need only identify the location by giving the identifying symbol, such as "A5." This tells the fire department to travel Road A to the fifth house, and the department can be sure the property will be marked with a sign reading "A5."

A less recent development, though still relatively new, is that of marking the homes of invalids, crippled or bedridden, with reflective markers. It provides important information rapidly for the firemen. Many convalescent and nursing homes have no exterior identification and appear like any other dwelling. Reflective material can profitably be used to identify such occupancies. It involves making the markers by applying reflective tape or sheeting to aluminum backing and tacking the marker in a uniform position—usually near the door. It is visible during the day, and a quick check at night with a spot or hand light provides the information.

"Lite-A-Bike" projects

A number of indirect uses of this material might be listed which involve fire forces in one way or another.

For several years firemen in many cities have undertaken projects in which they adhere reflective safety tape to youngsters' bicycles to make them more visible to approaching drivers during dusk and dark. One day, or one week a year, the department offers to apply the tape to the bicycle fenders of any youngster who brings his bike to the station. It adds increased safety for youngsters and furthers relations between the public, young and old, and the fire department. □□

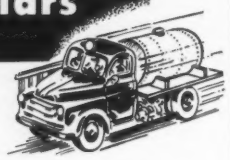
Acknowledgement: The editors acknowledge the assistance of the Minnesota Mining and Manufacturing Co., and the many FIRE ENGINEERING *readers who have contributed data used in this report.*

New York Dilemma

In 1937 more than 3,000 men entered the New York Fire Department service and are now eligible for retirement. These men have told fire department officials that unless the plans for reviving the three-platoon system are shelved they will hand in their retirement papers.

If these plans are carried out by the end of the year the city's Department of Personnel will have to hold a new fireman examination. Only about 3,000 names are left on the existing list.

Build your own fire truck for a few hundred dollars



The time has come when rural fire protection should leave the "Fancy Dan" class so that every small community can do a real down-to-earth job of extinguishing fires rapidly, simply and inexpensively.

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PERFORMANCE DATA—No. 26 PUMP SHOWN ABOVE

Pump Shaft R.P.M.	Pounds Pressure	Hose Length and Size	Dry Suction Lift in Feet	Vol. in Gal. Per Minute
1600	120	500'—1½"	20'	150

For complete specifications of this and other Oberdorfer All Bronze Booster Pumps, and name of your nearest distributor, write:

FIRE PUMP DIVISION OBERDORFER FOUNDRIES, INC., Syracuse, N.Y.

FIREBOATS

Continued from page 761

Chief Croker's recommendations also included twin screws, the aft elevated power mast, large-capacity monitor guns, water manifolds for hose lines, etc.

Three boats were authorized in the 1908 program, but possibly with the idea that it was not wise to make too heavy a commitment on revolutionary ideas, only the *James Duane* and *Thomas Willett* were designed as recommended. The *Cornelius W. Lawrence* followed its predecessor prototypes and was equipped with reciprocating pumps. Being designed for passage under the Harlem River bridges, this craft was not provided with the elevated water tower.

This was the end of the first period of the steam fireboat era, and the beginning of the second period of boats with turbine-driven pumps, multiple batteries of monitor nozzles and water towers.

Turbine pumps and oil burners

Notable boats with pumps of this second category were the *Joseph Medill* (1908) and *Graeme Stewart* (1913) of Chicago; *Duwamish* (1910), Seattle; *Torrent* (1910), Milwaukee; *Deluge* (1911) and *Cataract* (1914), Baltimore; *William J. Gaynor* (1915) and *John Purroy Mitchel* (1922), New York; *J. Hampton Moore*, (1921), Philadelphia; and *Deluge* (1921), New Orleans.

The *Mitchel* was the first of the New York boats built as an oil burner. In 1926 and 1927 the *Thomas Willett* and *James Duane* were converted to oil burning, and in 1937 a similar conversion was made on the *William J. Gaynor*.

The original *Joseph Medill* of Chicago, was a steam boat with turbo-electric propulsion and pumping. Built in 1908, the *Medill* was 104 feet in length and is particularly noteworthy because it is recorded as being the first turbo-electric installation with two 660-hp steam turbines connected to two 200-kw generators.

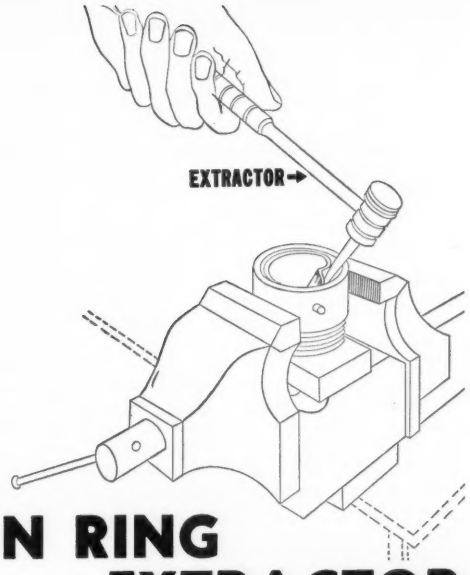
A feature of the *Medill* and the *Graeme Stewart* was the mooring spuds in the center of the hulls which could be power-driven into the river bottom to hold the boat while operating at fires.

The rebuilt *Duwamish*

The *Duwamish*, of Seattle, was originally equipped with steam pumps of 9,000-gpm capacity at 200 psi. She was rebuilt in 1949 and returned to service as a modern diesel-electric with 3,000 hp available for propulsion and pumping, enough power to pump 16,000 gpm at 150 psi. As a comparison with the original installation, the rebuilt *Duwamish* can pump 12,000 gpm at 200 psi.

The first fireboats of the internal combustion engine class were of the gasoline type. In 1918, the members of the San Diego Fire Department built the *Bill Kettner*, said to be the first gasoline-powered fireboat in this country. The *Kettner*, since remodeled, is a 59-foot vessel powered by a 220-hp Atlas engine for propulsion and carrying two other en-

HERE is unquestionably the simplest, safest, fastest and one of the most wanted tools ever devised for fire departments. In seconds, you can remove rings from ¾" to 6" O.D. Made of special tool steel, tempered for long use. Simply insert point of tool between hose and coupling. Tap a few times with hammer. When point is down to base of tool head, lift up and ring will pop out! You've got to try it to see how really simple and effective it is!



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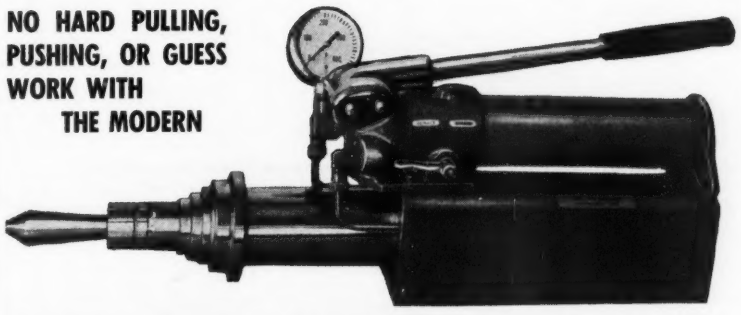

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gines of the same horsepower for operating the two pumps, rated at 4,500 gpm.

In 1925, three 85-foot fireboats, the *Mike Laudenklos* class, were commissioned at Portland, Ore. These boats have 20-foot beam and draft of 5½ feet. They were originally equipped with six Sterling engines, two 565-hp, 8-cylinder, and two 425-hp, 6-cylinder. The four pumps are rated at 9,680 gpm at 200 psi.

In 1951 the *Mike Laudenklos* was equipped with two 600-hp Hall-Scott V-12 gasoline engines and the two 565-hp propelling engines were removed.

The *Los Angeles City No. 2* was also put in service in 1925—a 98-foot boat with 19-foot beam and 6½-foot draft. She is powered with seven Winton gasoline engines of 2,100 total hp. This boat was built by Los Angeles Shipbuilding & Drydock Corp. at a cost of $214,000, and has a capacity of 10,200 gpm at 200 psi from her six Byron-Jackson four-stage pumps. The *L. A. City No. 1* and *L. A. City No. 3* are smaller units of the gasoline type.

Conversions to diesel power

The *Alki,* built in 1927 by Pacific Coast Engineering Co. at Alameda for the City of Seattle, had a capacity of 12,000 gpm at 200 psi and was powered by seven 350-hp gasoline engines. This 123-foot vessel was rebuilt in 1949 and converted to diesel power with the installation of two 500-hp GM Cleveland diesels for propulsion and six GM Detroit diesel twin-six units for pumping. The same 12,000-gpm pumping capacity was maintained by the new diesel plant.

It should be recorded that both Seattle boats are equipped with two pairs of underwater jets which are hydraulically controlled from the pilot house to assist in maneuvering and to offset the thrust of monitor fire streams.

A noteworthy conversion and rebuilding job on the old steam fireboat *W. S. Grattan* was completed in 1953 for the City of Buffalo by the Sturgeon Bay Shipbuilding Co., at a cost of $364,700. The 118-foot boat, which has been renamed *Firefighter,* is now equipped with four Caterpillar Diesel engines and four Dean-Hill fire pumps. This thoroughly modernized and completely diesel-powered vessel has a capacity of 15,000 gpm. She is practically a new boat of the most modern type, the original hull having been found to be in perfect condition for the installation of the new equipment.

Buffalo is one of several cities having separate fire mains which can be supplied by fireboat pumps. Another such installation is at Detroit, whose first fireboat, the *Detroiter,* was built in 1893.* Less than ten years later Detroit had two boats in active service at Engine Companies 16 and 25, the *James Elliott* and *James Battle.* In 1929 the 12,000-gpm steam boat *John Kendall,* with turbine-driven centrifugal pumps, replaced the *Elliott* and in 1936 the *Battle* was equipped with six Cummins diesels to power her pumps, while retaining steam for propulsion.

* Detroit recently discontinued its fireboat high pressure main system.

New York's *John Harvey*

Probably the largest and most powerful gasoline motor vessel built for the fire service was the *John J. Harvey,* constructed in 1930 for the New York Fire Department by Todd Shipyards Corp., Brooklyn, from plans by Henry Gielow, Inc. at a cost of $594,500. This 130-foot boat was provided with gasoline-electric power arrangement with five main engines connected to five 340-kw generators which furnished power for the two propelling motors and the motors connected to four LeCourtney pumps having a total capacity of 16,000 gpm.

The *Harvey* is now at the Camden plant of John H. Mathis Shipyards being modernized and converted by removal of the gasoline power plant and the installation of five Fairbanks-Morse diesels. When returned to service, the *Harvey* will be the last word in diesel-electric fireboats.

While the gasoline-powered boat had great advantages over this steam type, it had a very serious element of danger in its own fuel tanks. The difficulty of controlling explosive concentrations considerably limited the service of the *Harvey*

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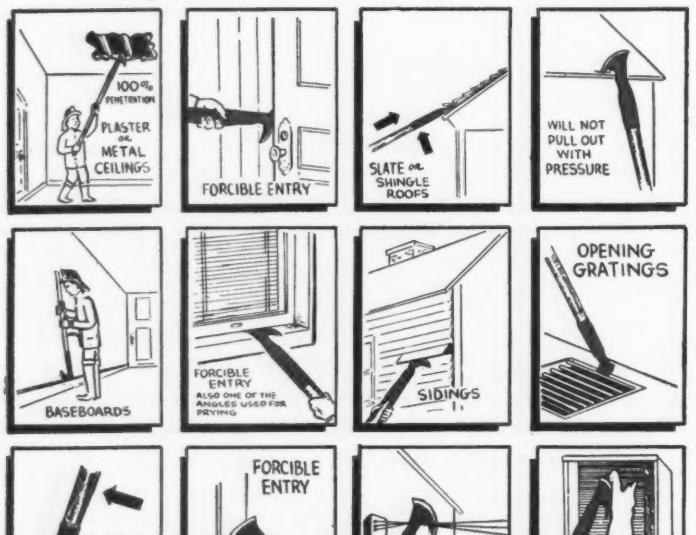

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for some time before the decision to convert to diesel power.

The first fireboat to be powered by electric motors supplied with energy from diesel-connected generators was the *Port Houston*, built in 1925 for Houston, Tex., by Bethlehem at Wilmington, Del., from designs of Cox and Stevens. The *Port Houston* definitely proved the advantages and effectiveness of diesels as fireboat power. This craft is 118 feet in length and 27 feet in width, and is powered by three Winton diesels totalling 1,165 hp and connected to generators which furnish 800 kw for propulsion and pumping. The pumping capacity was 8,000 gpm at 150 psi. Complete pilot house control was for the first time made possible in a fireboat, with its inclusion in this boat.

The second half of Mr. Meek's article will appear in the September issue.

HARLEM FIRE

Continued from page 777

uty Chief in Charge of Fire College, Otto H. Knochenhauer, arrived on the scene with five hose wagons. The probies placed their wagon pipes in operation and also relieved some of the firemen who had become exhausted during the early stages of the operation.

At about 1:50 p.m. Chief Connors, who had arrived and taken command, notified the dispatcher that he thought he could hold with what was on hand but that the situation was still critical. At 2:30 p.m. he reported the fire under control but all hands were still occupied.

None of the inhabitants of the exposed area was injured. Fire fighting personnel suffered 14 casualties of which only one was serious. Most of the minor injuries consisted of first degree burns suffered at the outset of the fire and at the time of the factory collapse.

Simultaneous fire threatens

At 2:25 p.m. Box 837, Seventh Avenue and 48th Street, was pulled for a fire on the fourth floor in the China D'Or restaurant at 1604 Broadway. Engines 23, 36 and 65; Ladders 2 and 4; Chiefs DePietri and McVann of the 8th and 9th Battalions, and Deputy Chief James Ward, 3rd Division, responded. Engine 54, due on this box did not respond having relocated in Engine 76 on the fifth alarm for Harlem Box 1541.

Because of the serious nature of this fire, Chief Ward called for a full assignment at 2:32 p.m. and Engine 8 was special-called to fill the request. At 2:34 p.m. Chief Ward ordered a second alarm. At that moment there was but one engine and one ladder still in quarters which would normally answer the second alarm from that box so Chief Dispatcher Keeler and Supervising Dispatcher Finneran jumped the request to a third alarm in order to obtain the necessary forces.

This hot and smoky fire occasioned some apprehension in view of the heavy dispersal of companies with the Harlem blaze but it was quickly subdued by the assignment and shortly after Chief Ward reported by radio that he could spare

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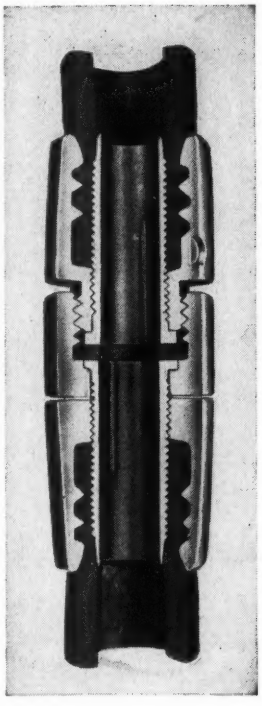

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engine companies responding on the "synthetic third" for duty at the fifth alarm if necessary. Incidentally during the course of these operations several alarms for other emergencies were received and handled without hitch by the Manhattan Fire Alarm Office.

The responses in detail

First alarm: Engines 37, 69, 80; Ladders 23, 40; Battalions 11, 16; Division 5.

Second alarm: Engines 36, 47, 59; Rescue 3; Field Communications Unit 1; Ladder 28. Relocating: Engines 56, 50, 41; Ladder 26.

Third alarm: Engines 35, 58, 76, 84; Ladder 30; Battalion 14. Relocating: Engines 40, 43, 54; Ladder 29.

Fourth alarm: Engines 53, 60, 67, 91; Ladder 34; Canteen; Gas and Oil Unit. Relocating: Engines 44, 84; Ladder 45.

Fifth alarm: Engines 68, 71, 83, 93; Ladder 14. Relocating: Engines 42, 48, 81; Ladder 43.

Special Call—Engines 2, 14, 18, 55; Five units of probationary firemen with hose wagons.

Box 837—2:25 p.m.

First alarm: Engines 23, 26, 65; Ladders 2, 4; Battalion 8, 9; Division 3. Engine 8 was special-called to fill out assignment; (Engine 54 normally due on first alarm having relocated on 5th alarm for Box 1541).

Second alarm: Normally Engines 1, 2, 8, and 40; Ladder 21 would respond. Only Engine 1 and Ladder 21 were available as other companies were either working at Box 1541 or were relocated because of greater alarms for this box. The dispatcher therefore transmitted a third alarm for the box.

Synthetic third: Engines 16, 21, 34, 39, (Engine 14 normally due on this was working at Box 1541); Ladder 24; Battalion 6.

Relocating: Engines 72, 260, 13, 28; Ladders 16, 20, (Ladder 22 would normally relocate at Ladder 21 but was held in quarters to keep West Side covered); Engines 292 and 325 (Queens), were special called to relocate in Manhattan.

Handling the operation were Chief Dispatcher Charles Keeler, Supervising Dispatcher Patrick Finneran, Dispatchers Pearlman, Gallagher, Szermer, Chayette, Mathews, Pearson and telephone operator Margaret McLoughlin. □□

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NEW ORLEANS FIRE DEPARTMENT

Continued from page 773

central office from Box 2, Henderson and Levee Streets.

The year 1860 was also a memorable one. The original contract with the city expired and a new contract was adjudicated with the Firemen's Charitable Association for five years at $90,000 per annum. It called for maintenance of 14 engines, five steam engines and four hook-and-ladder companies with a complement of 700 men.

Early that year a disastrous fire occurred in a warehouse and falling walls trapped many firemen, killing "13 or 14" and badly injuring many others.

That year, under the shadow of war, a plan was submitted by the F. C. A. and adopted, to organize the fire department into a military body, armed and equipped as militia. The men were to be uniformed as zouaves with a battalion known as "fire brigade." Many men from the ranks enlisted in this newly formed Southern Army.

As the Civil War progressed and New Orleans finally fell into the hands of Federal forces in 1862, the city's fire department was confronted with a unique crisis. In May of that year the city came under the rule of General Benjamin F. Butler who issued an order permitting the department to retain its organizations but requiring them to take the oath of allegiance to the United States of America. To avoid this restriction, many citizens left the city but the firemen, following a sense of duty it is said, kept its members at work.

In this delicate dilemma, the president of the Firemen's Charitable Association suggested a plan which called for firemen to remain neutral in consideration of which privilege they would "keep the city from burning up."

In spite of the doubts and ridicule provoked by this proposal, General Butler

accepted it, advising that the parole be drawn up, signed and sent in. More than 95 per cent of the members of the fire department signed the parole and it is recorded that not one member was ever known to violate it, notwithstanding the fact that the unusual privilege of leaving the city without special passport was given to the firemen.

As a result, the fire service of the city performed uninterruptedly as if there had been no war and no military occupation. Nor were there any conflicts between troops and fire fighters.

A letter to the *National Firemen's Journal*, now FIRE ENGINEERING, in 1878 throws light upon the department and its popular head, Chief O'Connor. "The latter is a man who is cool-headed at a fire, takes in the situation immediately and goes at fighting fire in a business-like way. . . . Not only is he a good fireman but he is a thorough mechanic and has made many improvements in his department. When a new engine is bought, he tests it himself . . . quite a number of his hose carriages and hook-and-ladder trucks are manufactured in New Orleans under his direction."

The correspondent said: "From the $140,000 annually appropriated by the city they pay 19 steam engine companies $4,000 each and four hook-and-ladder companies $2,400 each and one hand-engine company $360." He added, "They have a beautiful cemetery for the reception of their dead (the shaft erected to the memory of Urad Ferry, a martyr to the service, is still standing)."

The period 1878-80 was marked by brawls which were "religiously investigated." Some of them concerned the coming of the chemical engines. The merits of steam vs. carbonic acid gas (in the chemicals) were heatedly debated. There was also unrest—some of it political—over the question of paid firemen and the need for more apparatus. The Board of Control failed to see eye to eye with the firemen. In 1894, Chief O'Connor was told his expenses to the conference of the International Association of Fire Engineers would not be paid and people criticized "the beggarly and cowardly action of the New Orleans commissioners."

New "auto engines"

Another sidelight of that year concerned the new auto engines. Said the *Fireman's Herald*: "The new big auto engine at New Orleans is not in universal favor and Chief O'Connor himself does not enthuse over it. Commissioner Sullivan does, however." The skeptics claimed it would not run over the streets, that it would break down all the bridges and painted a black picture of the new innovation. Nevertheless, the commissioner said, "The horseless carriage is a success . . . the pumping power of the new auto engine has been proved satisfactory." In the trial run made up Charles Avenue, the team of horses on the wagon carrying the officials could not begin to keep up with the auto which failed to injure either pavements or bridges.

The City of New Orleans had been host to the original association of fire

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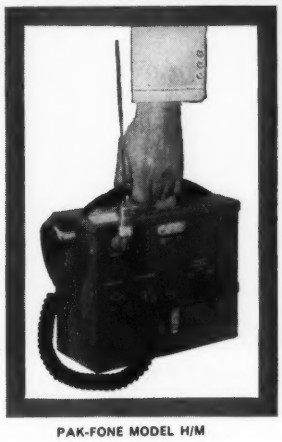

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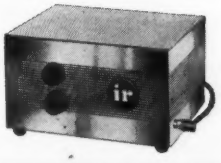

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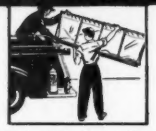

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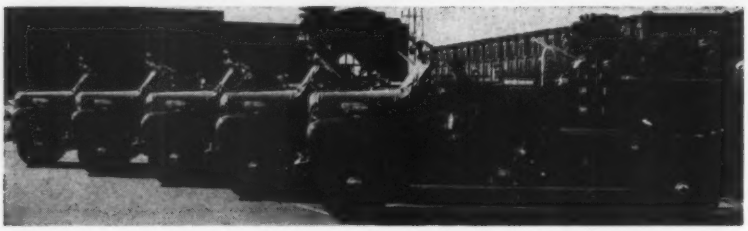

The New Orleans Fire Department recently added these five new 1,000-gpm pumpers; five more are to be added this fall—*New Orleans F.D. photo*

Chief Howard L. Dey using handy-talkie, observed by Captain William Arnold, training instructor, and Captain Edward Thomas, assistant training instructor, during pumping test

engineers in 1883, and was again host to the association in 1914, and the matters of the auto engine, of hard rubber tires and weak bridges again were aired, along with such subjects as sprinkler systems and what was to become of the volunteer firemen. Already there was talk about "standardizing motorized apparatus."

No particularly radical developments occurred between the start of World War I and its close except that like others, the department was hard put to make ends meet with personnel and equipment —and finances.

In 1926 the city again was host to the Association, the name of which was changed at that time from International Association of Fire Engineers to the International Association of Fire Chiefs. That year also the Southwestern group became a part of the body. Much excitement was manifest over the forthcoming motion picture "The Fire Brigade," a print being shown at the conference.

At that time there were 28 pumpers, 11 ladder trucks (two aerials), four hose wagons, one squad, two water towers, and two auto chemicals in service. A new head of the department was in charge by then in the person of Chief John M. Evans. In 1928 at a big fire in Algiers a lieutenant was killed. That year, Chief Evans stumped actively for higher wages for his men.

Also, that year, at the IAFC conference in Philadelphia, Chief Evans, who had served as vice-president for two years was elected to head the International.

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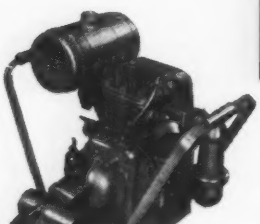

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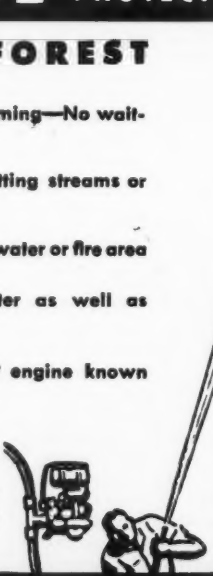

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ments—and problems—came to the department. Of the latter, one was to fight fires in 1929 started by rioting traction workers.

The middle 30's saw recommendations by the rating board and the National Board of Fire Underwriters for drastic changes in the department including seven new fire stations, abandonment of 18 and relocation of many others. Although no important moves followed immediately, the fire patrol went out of business in 1941. In 1942 the department had 690 men and 58 pieces of equipment.

The popular chief succumbed to illness on October 15, 1945. His successor was Frank Rivard, a provisional appointee, who shortly gave way to the present incumbent, Chief Howard L. Dey. This will be the second IAFC conference for which Chief Dey is host chief.

Today's fire department

The present New Orleans Fire Department is full-paid, with a total personnel of nearly 900, operating on a two-platoon, average 60-hour-a-week basis. It is commanded, as mentioned previously, by a superintendent (chief), Howard Dey. The assistant superintendent is Patrick T. Burke.

The city is divided into eight districts, each having three district chiefs. The department instructor is Charles H. Pecoul and the head of the fire prevention bureau is Sidney C. Ford. John W. Zeringue is supervisor of repairs; Superintendent Fred Ruckert heads the fire alarm telegraph system.

According to the 1956 reports there are 37 fire stations. Apparatus consists of 46 pumpers, all 500 gpm or over, in the first line and four in reserve; 12 ladder trucks (two service trucks) in first line and one aerial in reserve; one hose truck and one fireboat (not owned by the city). A water tower is kept in reserve as well as numerous miscellaneous apparatus.

Of the pumpers, 31 are equipped with booster tanks; two have proportioners for foam and wet water, and five have pumps for high pressure streams. All pumpers carry short ladders and 12 carry three-section metal extension ladders.

The department has completed, or is completing, a fire-resistive training tower and other training facilities, consisting of

Deputy Chief Patrick Burke using handy-talkie from atop 325-foot Hibernia Bank building during pumping test

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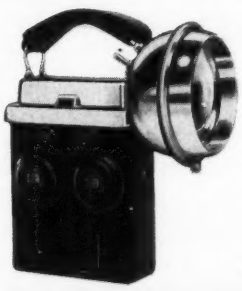

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Now of stainless steel—over 1000 hours battery life—½ mile beam with adjustable focus . . . A *Non-Fading* light. And now Koehler introduces its new automatic charger—eliminates all charging guesswork—just plug in—the charger does the rest.

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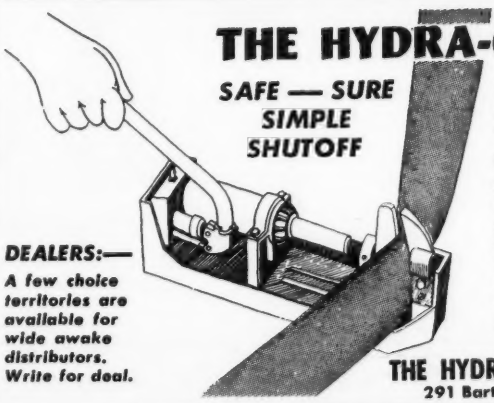

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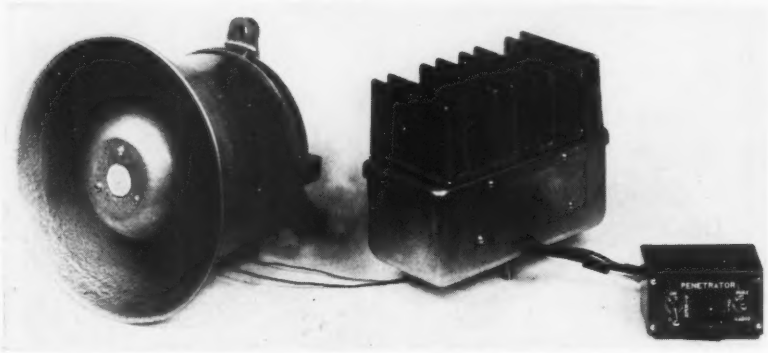

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pumper test pit, large quonset hut, and hydrants in a paved, floodlighted area. A training school is conducted at the Isaac Delgado Central Trades School. Probationary firemen receive two weeks' training before being assigned to a company. Company schools are held daily at quarters and regularly scheduled company drills are conducted at a former school building. There is also an officers' school.

Fire prevention effort is carried out largely through field inspections by radio-equipped engine companies. District chiefs inspect hazardous buildings in their areas. A block-by-block occupancy study has been underway.

Response to alarms varies. In the principal business district response calls for four engine, two ladder and one rescue company, and two chief officers. Additional predetermined assignments call for up to 31 engine and 11 ladder companies to, and including, the fourth alarm.

In the last 10 years, the department has expanded by the addition of two chiefs' districts; organization of three engine and one ladder company; nine engine and two ladder companies have been relocated. New apparatus includes eight pumpers, four aerial ladders, two tractors, a squad truck, salvage truck, hose tender, eight chief's cars and a number of lesser units. Five new pumpers and an aerial ladder were scheduled for delivery in 1956.

Five fire stations have been built, five extensively remodeled and five have been abandoned. Station 2 has been replaced and a former railroad passenger station is expected to be remodeled into a firehouse. Mutual aid contracts for fireboat response have been signed with government agencies. The department adopted its own radio system in 1953, mobile transmitter-receivers being placed on all apparatus, with receivers at watch desks of stations and portable units carried in chief's cars.

On March 1, 1956, the city contracted with the Southern Bell Telephone and Telegraph Company for installation and maintenance of a leased telephone-type fire alarm system, said to consist of 750 emergency reporting telephone boxes of which about 200 were to be installed within the business district. □□

Dock Fire Record Tragic

Arthur Spiegelman, a fire research engineer of the National Board of Fire Underwriters, called the nation's fire record on waterfront fires over the past three years "tragic." Speaking before the Kiwanis Club of Jersey City, Mr. Spiegelman told the group that in less than three years there have been 12 waterfront conflagrations with losses over $21,000,000.

He called "a monstrosity" from the fire protection point of view, combustible piers loaded with dangerous cargo and extending more than 1000 feet from the shore line. He stated that fire on such a pier is often inaccessible to the greater part of the fire department manpower and equipment. The engineer also said, "In addition, ships loaded with dangerous cargo may be difficult to move from a pier during a fire. It is not unusual to see huge piers completely demolished."

GAS TURBINE

Continued from page 823

and sixteen foot suction lift. Diesel fuel was required, as was hand starting and a waterproof ignition system of maximum simplicity that would operate reliably without battery or external power source. These design requirements were incorporated into the Mars, making possible a hand-started gas turbine pump weighing only 185 pounds that can be carried by two men.

Evaluation of the turbine pump

In 1955 Robert C. Byrus, director of the Fire Service Extension, University of Maryland, undertook an independent study of the Solar pump. The study consisted of a series of tests to evaluate both existing and potential applications for gas turbine fire pumps. Results of these tests, published in a report by Mr. Byrus, indicate that turbine-powered pumps should contribute importantly to the future of fire fighting. Said Byrus, "The turbine-powered pump has many times the capacity of conventional portable pumps. It is capable of either relaying to a conventional pumper or supplying direct hose lines. Its potential as an emergency pump for forest and civil defense operations is immense."

Other significant conclusions are these:

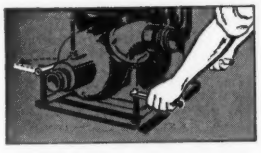
1. The capabilities of the turbine pump are beyond anything now available with a similar weight.
2. The noise accompanying operation of the turbine becomes less objectionable with experience.
3. The unit is capable of delivering large quantities of water from sources inaccessible to conventional equipment.
4. The unit has great potential as an emergency source when connected directly to a hydrant.
5. Inexperienced personnel are able to start and operate the unit after very simple instructions.

The gas turbine has its own unique advantages. As a power source for fire fighting it has a high power-to-weight ratio, can be hand carried to inaccessible water sources, and can be operated on a variety of fuels—qualities of immense importance to forward-looking forestry and civil defense personnel. □□

Helicopter Ferries Firemen

Recently New York firemen were fighting a brush fire on Staten Island when a passing helicopter spotted another fire nearby. Captain Johnson, commander of the U. S. Coast Guard 'copter, realized that the firemen could not reach the blaze because of intervening creeks and marshes.

He landed near the site of the first fire to provide ferry service and in four flights carried eight firemen and their equipment to the scene.



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Gorman-Rupp Fire Fighter Pumps are backed by a positive plain-language guarantee. Ask your distributor for Bulletin 9-FD-11 or write direct.

Model 61½A-23FB	50 GPM @ 110 lbs.
Model 6201 FF	100 GPM @ 80 lbs.
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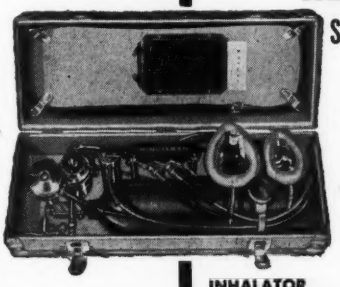

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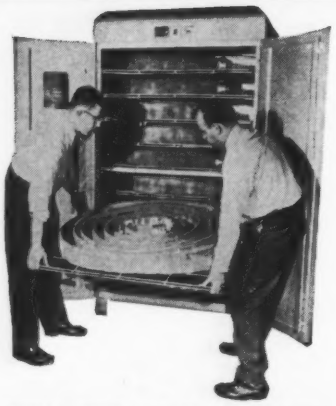

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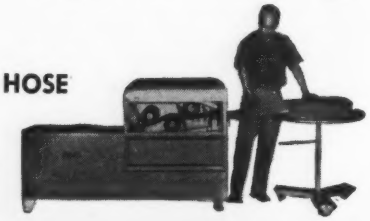

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TRAFFIC CONTROL

Continued from page 793

The requirements of the community govern the indications that may be arranged. These may be all red over a wide area, green along a special street or combinations of streets which the apparatus normally will follow; or individual corner indications changed only as the apparatus officer directs by means of radio communication back to the dispatcher. All of these systems have a special timing device which automatically returns the signals to their normal pattern after the apparatus has cleared the intersection.

Next we have the electronic systems which use a special adaptation of radio signaling to perform the same switching operation with the advantage that no wiring is required between a central point and the individual signal at the intersection.

One system uses a central master transmitter which sends tone impulses to the corner signals in order to change the pattern to that desired. All regular traffic indications are operated by the corner controller and these may be changed by special impulses to give any predetermined pattern.

Perhaps the most spectacular system now in use is that which controls the individual corner signal by means of a special radio transmitter mounted on the fire apparatus. No special wiring or other central controls are necessary other than the radio receiver and pre-emptor mounted directly on or near the traffic light which is to be controlled. As the apparatus approaches the intersection, a switch is operated by the vehicle and the transmitter sends an impulse to the receiver on the signal standard. This in turn activates the pre-emptor which takes over from the corner controller and sets the signal to the desired pattern.

In addition to setting the traffic lights, this electronic system also activates a special signal light which serves as a warning to other vehicles that may be converging on the intersection at the same time. This additional attribute is looked upon in some fire circles as the most valuable advantage of the system. It is believed that this warning signal may conceivably prevent that most serious of all fire service accidents—the collision between responding apparatus.

The questions raised by some fire chiefs following the 1956 article in this publication showed that there is a definite need for more information on signal indication patterns. Should the lights be all red, flashing red, flashing yellow, green in one direction or out entirely during response?

From correspondence and actual observation, it is the concensus of opinion that the answer must be found by study and analysis of local conditions. For example, the City of Evansville, Ind., is equipped with a traffic signal system that may be remotely controlled from a central point by means of radio. Tone signals vary the pattern as required and for fire response the signals show a flashing pattern, red against traffic that is required to stop and amber along the route of the apparatus.

The intention is to allow vehicles ahead of the responding fire units find a place where they may either pull over to the side of the curb or turn a corner to clear the path for the oncoming fire vehicle.

Newark's experience

The following brief account of the traffic problems encountered by the Newark, N. J., Fire Department and the results of its efforts to correct the situation is taken directly from a report by Chief Engineer Harry J. Sommers to FIRE ENGINEERING.

On March 28 of this year, the City of Newark placed in operation on an experimental basis, an emergency electronic traffic control system. The system operates by means of small radio transmitters installed on each of nine fire department vehicles which act as control units for special radio receivers mounted on the traffic signals at 14 street intersections.

The location of the intersections which are controlled and the vehicles in which the transmitters are installed was decided upon during a conference between James T. Owens, director of the fire department, Chief Engineer Sommers, and Edward Cyr, Newark traffic engineer. A grid location map for the controlled signals was laid out and at the same time the company apparatus and chiefs' vehicles frequently responding in the area were selected for the pilot installation.

Following several trial runs and after some minor adjustments, the system was declared ready for actual use and departmental orders were issued covering the proper operation of the equipment. Mounted on the dashboard of the apparatus is a small control panel containing an off-on switch and a direction control switch marked NS and EW; this last switch is thrown in the proper direction depending on whether the apparatus is traveling in a north-south or east-west direction.

As soon as the apparatus leaves quarters the equipment is turned on and as an intersection is approached the direction switch is operated as desired. Almost immediately the red warning light mounted over the main traffic light begins to blink, warning motorists, pedestrians and fire apparatus that a fire vehicle is approaching the intersection.

About five seconds after this action begins, the traffic signal indications change to green in the direction of travel and red on the cross streets. The entire action is controlled from the apparatus and it is Newark's experience that in some cases control is exercised over four intersection lights preceding the apparatus.

One confusing problem that has confronted the Newark department for many years concerns the response of Engine 1, Ladder 1 and Battalion Chief 2. The quarters of these units fronts on a short one-way street connecting with a main traffic artery. During some periods of the day, traffic backs up to the front doors of the station. In the past, serious delays have been encountered, following receipt of an alarm.

By the use of the apparatus traffic con-

for FAST ACTION, the CHAMPION® FOG-TYPE FIRE FIGHTER

Cools • smothers • kills fires before they spread

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Here's the model preferred by many fire-fighters because of its easy control of pressure, fog-spray and use of water.

By breaking water up into a fog-spray under pressure, the Champion Slide-Action Fire Pump cools burning substances, smothers the fire—*makes a little water do a big fire-fighting job.* Powerful slide-action pump is brass throughout with non-corroding, self-cleaning ball valves. The brass nozzle adjusts from fog-spray to 30-ft. stream by merely rotating nozzle cap. 4-ft. hose attached at top prevents water from running out when pump is below bottom of tank. Large filler opening has leak-proof cover with carrying handle and locking device to hold pump when not in use. Ventilated back of Champion design keeps operator's back dry and cool. Quality-built by a manufacturer of dependable spraying equipment since 1915.

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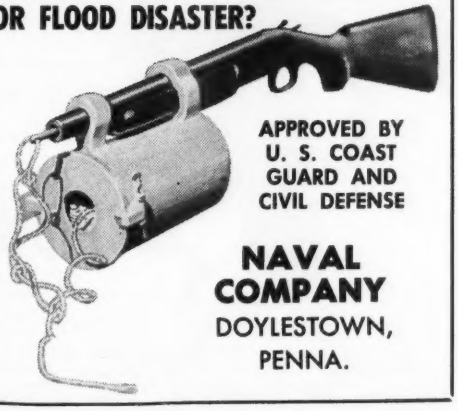

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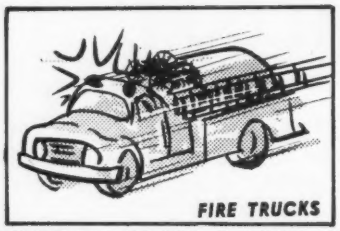
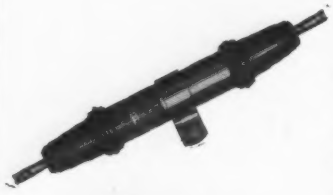


FIRE TRUCKS



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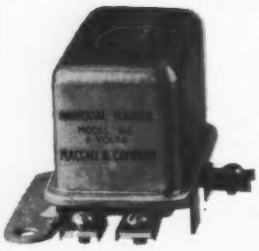

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trol unit this situation has been overcome. Upon receipt of an alarm the control switches are thrown as soon as the motors are started. Before the apparatus crosses the door sill the traffic signals controlling the dead-end intersection of the one-way street with the main thoroughfare have changed to green. This allows the short street to empty and permits fire apparatus to respond without delay. The light remains green until the apparatus has cleared the intersection and then the signals resume their normal pattern.

Chief Sommers and the Newark officials are very pleased with the test results of the system and are planning to expand intersection and apparatus installations during this year.

At the present time many cities are experimenting with and installing similar electronic controls in an effort to assist fire departments in coping with the ever mounting traffic problem. Typical of these are Baltimore and Los Angeles.

These and other communities have recognized that the time for action is now, for the traffic densities continue to increase with every hour of the day. It may be too late if the decision to act upon the problem of fire service response versus traffic conditions is delayed even for one year.

Closed circuit TV control

Another form of traffic control which undoubtedly will be explored thoroughly in the months ahead, is closed-circuit television used in combination with radio-controlled traffic lights. According to Frank P. Barnes, manager of marketing for industrial television in General Electric's Technical Products Department, Syracuse, such a combination can keep city traffic moving faster, more effectively and cheaper than any method yet devised.

As outlined by Mr. Barnes, here is how a system would be coordinated from a centralized traffic control bureau.

Closed-circuit TV cameras would be located strategically along busy cross-city intersections or other important traffic arteries. Each camera would be focused on a system of mirrors at the intersection. The mirrors, in turn, would afford a view of traffic flow from all four directions of the intersection. By a system of measured stadia or graduated marks on each mirror, the distance of traffic from the mirror could be calculated. This would include the approach of any emergency vehicle.

A traffic coordinator, seated in front of a bank of television monitors, or receivers, at a central traffic bureau, could thus view traffic conditions at any number of intersections. The closed-circuit TV system combined with radio controls, would give the traffic coordinator push-button control over the timing of the red and green lights at each intersection. In this way, he could speed heavy traffic in one direction while slowing lighter traffic in the other. Either through monitoring, or signals received from fire alarm headquarters, the coordinator could control the passage of the apparatus.

Closed-circuit TV as defined by Mr. Barnes, is transmitted by coaxial cable or by microwave from the camera audi-

ence. It is not broadcast and cannot be received by the general public. If transmitted by cable, no licensing is required by the Federal Communications Commission. If carried by microwave, frequency assignments must be granted by the FCC.

Just for the record, a still newer development known as "slow scan" may shortly permit transmission of both audio and video signals over telephone lines. According to Mr. Barnes, "slow scan" is a new closed-circuit television technique which transmits one image every four or five seconds instead of the customary 30 per second. Just how this will further fire department response through better control of traffic remains to be seen, but with the remarkable strides being made in electronics there is every reason to expect notable developments in this form of traffic control with benefit to the fire service and to the community. □□

BETTER SELL "AUTOMATICS"

Continued from page 801

other doorway in a back alley, it developed that the management was so burglary-sensitive that the double metal doors were double-barred with heavy angle iron, and double-padlocked. Cutting torches were employed without avail, and finally an auto two-ton truck was moved into the alley to pull the doors off. In the 45 minutes which elapsed, the blaze gained complete control of the basement and extended up through the hollow partitions. Loss, $500,000.

Everett, Wash.: Cedar siding mill built on piles over tide flats with two sides inaccessible due to water. With a totally inadequate sprinkler system for the type of hazard, 900 heads opened in the first few minutes, overpowering the water supply. First engine companies attempted to take suction from yard hydrants, but got no water so had to relocate; one company trying to pump into the sprinkler system was beaten back by the heat. Loss, $750,000.

Garland, Tex.: Manufacturer of electronic devices. Fire discovered by watchman in cardboard trash box; he extinguished that, but the blaze got away from him up the combustible fibreboard partition to the suspended ceiling, also covered with combustible fibreboard. By then the telephone wires had burned through, so the watchman hopped in his car to go out and find a telephone. Eleven pumpers responded on mutual aid plan, but only four could work because of poor water supply. Nearest hydrant, 500 feet. Loss, $1,000,000. *Plans for new plant do not include sprinklers or private water supply!*

Dallas, Tex.: Large truck-freight terminal under protection of an elderly, untrained, unsupervised watchman. During his coffee break at 5 a.m., the watchman heard a suspicious noise, investigated and found the freight section on fire. He returned to the office, possibly for his coat, then went to his car and drove to a

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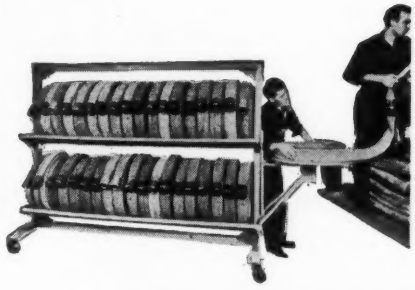

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nearby tourist court to telephone the alarm. Firemen, already responding, could see the blaze a mile away; roof and one wall collapsed within ten minutes. Efforts to make an interior attack were frustrated by 30 truck trailers parked in front of all available doors. Loss $1,900,000.

To these random examples may be added many more to be found in other documented articles in this and other issues of FIRE ENGINEERING.

Integration no answer

Many suggested solutions to the problem have been advanced by well meaning but poorly informed persons outside the fire service. One of the most widely touted cure-alls offered—and being tried out in a number of communities, mostly small—is integration of fire and police forces. None of our large-loss fires, however, has occurred in areas protected by such joint forces.

No, integration with the police department hardly seems to be the answer to the problems involved! In fact, a merger with the Army, Navy and Marine Corps would be of slight avail if the building is doomed before the box hits in. Yet in virtually every large-loss fire this is the basic situation resulting from either structural or human weaknesses, or both; in only one or two of the reports is there any hint that the fire department might have done better, and these were very small departments which were without proper training or equipment.

Bad business in every way

For years I've been trying to tell businessmen that a bad fire is very bad public relations. By the same token, a bad fire is not good public relations for the fire department, regardless of why it got bad. For the public always has a sneaking idea that maybe it wouldn't have been that bad if the department had been on its toes. We know this is cockeyed reasoning, but the public doesn't. And unless you have taken pains to tell them the story over and over, you can't lay the blame entirely on them.

It isn't as though the fire service hasn't sound, effective fire protective measures which it can justifiably promote in its efforts to reach that Utopian goal that I've just mentioned. These measures, in the form of automatic fire detection, notification and control and extinguishing systems, are going institutions. They're here right now. They're functioning. And when you consider their fire safety factors and features, they're the most practical, beneficial good-will builders any fire force can promote.

It seems to me, therefore, that the alert chief simply has to redouble his efforts to sell automatic protection to the municipal government, to the property owners, to the public. I don't mean that he should go from door to door, canvassing the neighborhood. I simply mean that on every occasion he has to open his mouth in public, he should hammer on the theme of the *defenseless building* that is just as much a prey to destruction as is

not even a HOT FOOT!

. . . just comfortable. At a recent test at a world leading Petroleum Producer and Refiner Proving station Fyrepel fibre glass aluminum coated fire fighting suits proved best by test—in temperatures over 1700° Fahrenheit. For repair work in heat areas, suit will eliminate costly down time and allow workers and repairmen to work in comfortable safety in temperatures 1700° and over—while temperature inside suit remains at slightly above normal body heat. Many varieties of garments are available.

This lightweight (9# 1 oz.) Proximity suit allows men to stand up to heat for extended periods and actually wade in spill-fires. Wide vision helmet provides maximum safety and maneuverability. Addition of neoprene lining makes it waterproof and provides effective vapor barrier. FYREPEL is the only fabricator of aluminized glass cloth. Do you have a specific problem? Our Engineers would like to hear about it. *Write, wire or phone.*

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the defenseless child left unattended by his parents.

There's no reason at all why you shouldn't rub this in again and again when you talk at meetings of service clubs and civic groups; in radio talks or interviews with the press—even in private conversation. The basic theme is simple and plainly understandable: "What good are all our jet planes, guided missiles and atomic weapons IF we haven't got a foolproof warning system? Remember Pearl Harbor?

"Sell" automatic warning

Analogies like this always seem to strike home with far greater impact than a straightforward statement of fact, possibly because they give the listener a chance to make the comparison and come up with his own answer. In any case, such proselyting should begin right at the scene of the blaze.

"What caused the fire, Chief?" asks the reporter.

"I don't know yet what caused it—but I can tell you what made it bad: The inexcusable lack of *adequate* automatic protection," would be a good reply.

"How much are the damages, Chief?" another newsman inquires.

"I'd say in the neighborhood of $300,000," you say. "But if they had had *adequate* automatic protection in there, we could have held it to $500."

"How many bodies have you found, Chief?"

"Four so far. And they'd all be alive and well if there had been *adequate* automatic protection in that building."

And so it can go, always banging away at that word "adequate"—for your own protection as well as for the sake of accuracy. For automatic systems do fail occasionally. But nine times out of ten when they do, it is because they were not adequate. The hazard was too severe for the age, type or extent of the system; the system was inoperative because of human failure; the sprinklers hadn't sufficient water for any of several reasons, etc., etc. Dependence upon such protection is on a par with locking the front door and leaving the key in the lock when you go away. That just isn't *adequate!*

Consequently, any automatic system that is installed and then forgotten is comparable to leaving the key in the door. Just like our far-flung radar network for national defense, an automatic protective system must have constant supervision, inspection, maintenance *and testing.* This, in a nutshell, is why central station systems safeguarding property values exceeding $20 billion, have provided a proven fire immunity of 99.98 per cent. Who can argue with figures like that?

However, a lack of rebuttal does not guarantee the acceptance of a fact: The story must be reiterated time and again with relentless regularity in order to slowly wear down the natural resistance of the human mind. And when this story is well garnished with plain facts about the threat to life, limb and property values in the neighborhood housing a large-loss fire—which means a potential conflagration—its impact on the listener is mag-

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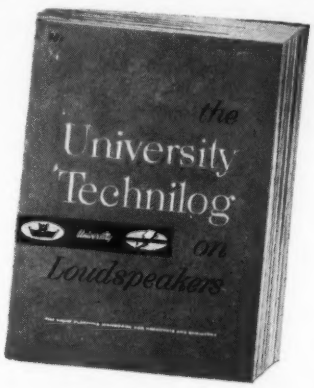

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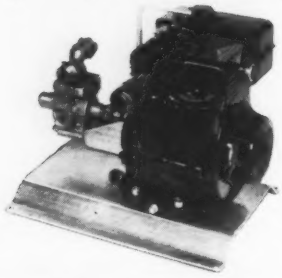

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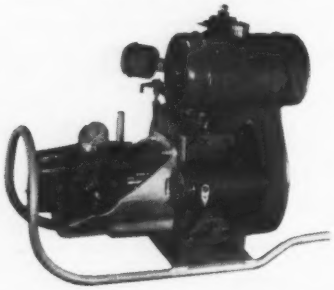

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nified. Any man is far more concerned about possible jeopardy to his wife and kids than about the possible jeopardy to some corporation's profits. And we need only return to Mathew Braidech's disturbing forecast at Miami to see how this aspect of the story shapes up.

The whole lesson of the N. F. P. A.'s large-loss fire report is graphically summed up by the trend. In 1941 we had 48 such losses—last year we had 430. And any academic quibbling about the relative value of the dollar falls flat when you realize that in the manufacturing field alone, large-scale fires jumped from 78 to 176 in *one year!*

This trend is not going to be retarded; it is going to be accelerated by the increasing influx of new and fantastic chemical hazards plus the mounting demands of modern business for larger and larger work areas, greater production and storage, faster tempo—and less interference. So no chief can ever "hit the pipe" hard enough to dream of having *enough* apparatus and *enough* men to carry the burden that is being placed upon him. You're not going to save any building that's doomed before you're even called; you can thank your stars if you save the neighborhood! And all these new developments simply make it easier to doom a building quicker.

So from where I sit, it certainly looks as if our only hope of even staying in the fight for the full distance must be pinned on a wider acceptance of an *adequate* "warning system" which will enable us to put our guided missiles and atomic warheads to work when they can do some good.

That's why I say the smart chief today had better sell automatic protection —in plain self defense! □□

JAMBOREE

Continued from page 830

cots, chairs, water cooler and desk. Meals were provided at the nearest Boy Scout headquarters.

Many volunteer services

Additional auxiliary equipment was provided for the fire department in the form of tank trucks. The Atlantic Refining Co. furnished a 4,500-gallon unit and the Leaman Transportation Co. a 5,500-gallon unit. A four-wheel drive jeep equipped with a 275-gallon water tank, portable pump and booster line, was loaned by Chet Taylor of Westwood, Pa. The Pennsylvania Department of Forests and Waters provided 30 back-pack pump tanks for distribution in the camp areas. The Ansul Chemical Company loaned several dry chemical extinguishers for use on flammable liquid fires.

The fire department responded to 18 fires during the Jamboree. Seven of the fires were in grass and woods; five in trucks and cars; two in tents; one in a Pylon entrance gate; two in construction storage areas and one in a trash dump.

Every fire station offered a place for the Boy Scouts and their leaders, who were either fire buffs or firemen back home, to play visiting firemen. With over a hundred different rigs to inspect, they had a real field day. Thousands of persons stopped in to say "hello."

Boy Scouts at national Jamborees are noted for their ability to swap. They will swap just about anything they can take back home with them. In one case they swapped a huge gateway entrance sign for the fire apparatus owned by the Washington Fire Company from Coatesville, Pa. The swap, however, was short-lived, for alas, the fire chief of Coatesville is also the chief of police and he made them give it back. □□

Grand Jury Hits Forest Neglect

The San Bernardino County, Calif., grand jury recommended the immediate clearing of flammable brush along highways leading into San Bernardino National Forest during a recent session. The jury report read, "This should definitely be a must before the fire season begins . . . to prevent further devastating fires such as we had in the fall of 1956. There is much talk of fire prevention when a fire is in progress, but that seems as far as it ever goes."

In addition to clearing areas adjacent to the highways the grand jury suggested that water lines be laid along the crest of the San Bernardino Mountains and through the danger area. It also pointed out that firebreaks across the ridges of the southern slopes of the mountains had been neglected and allowed to grow up with grass and brush "so that fire sweeps across them as though they were not there." More access roads into isolated mountain areas for use of fire equipment also were suggested.

The jury urged that the project be undertaken as a joint activity of the county, state and Federal divisions of forestry, with prison labor assisting.

New York "Ups" Ladder Length

New York City Fire Department is going in for 100 foot aerial ladders. Recent action by the Board of Estimates appropriating $850,000 for equipment included $452,000 for 13 aerials, two of which are to be 100 feet and 11 ladders of 85 feet.

The appropriation embraces $228,000 for 12 pumpers of 1,000 GPM; $132,000 for eight pumpers of 750 GPM to replace over-age hose wagons. The budget director's report to the Board of Estimate states: "Rather than have a vehicle at the scene which can furnish merely hose, it is proposed to have a pumper which can furnish hose and at the same time provide pumping capacity to either supplement other operating pumps or to replace pumps which become inoperative."

A rescue truck for $25,000 to replace Rescue 4 in Queens County and a floodlight truck for $13,000 are included.

Jerry Daly

WET WATER APPLICATION

Continued from page 791

however, that energy is the ability to do work or that which can produce changes in matter.

Energy, as well as matter, can neither be destroyed nor created. These we call the laws of conservation of energy and matter. Modern day science considers energy and matter as manifestations of one and the same thing and extends these basic laws to include the fact that the total matter-energy balance remains always the same. Matter is believed to consist of electricity, which of course, is a form of energy.

Energy may be considered as being of two kinds, kinetic energy and potential energy. Kinetic energy is energy of motion. All moving bodies possess it to some degree. Potential energy is energy stored in a body that is under stress, or when it is lifted, compressed, stretched or twisted. Energy is needed to lift water into a storage tank atop a building. The water now has potential energy due to its stressed condition, because it is held back from seeking its normal level at a much lower level. When a valve is opened below, the energy is changed to kinetic energy and the water issues forth in a solid stream that can do work against objects. This we have seen when windows are pushed in or heavy walls are toppled over by use of a hose stream.

Molecular energy, then, can at one moment be in the kinetic form and at another moment be in the potential form. The molecules are in constant collision and random motion, at one time transferring energy to the other molecules they collide with, and at another time gaining energy from them.

The average kinetic energy possessed by the molecules is a measure of the degree of heat possessed by a body. The higher the average kinetic energy or speed of the molecules, the higher the temperature of that body. The total kinetic energy of all the molecules is a measure of the total amount of heat in the body. The temperature of a glassful of water may be higher than that of the water in a storage tank, yet the storage tank of water can possess more total heat.

Returning again to our study, we may now apply the terms we have just defined to describing the phenomena associated with liquid surfaces, knowing that the precise meaning of terms is fully understood.

Properties of liquid surfaces

The fields of force surrounding each molecule and its position gives rise to some special properties of surfaces. There are two types of attractive forces to be considered in this connection, i.e., those between molecules of the same kind, called "cohesion," and those between molecules of different kinds, called "adhesion." The force of cohesion enables the molecules of water, for example, to hold each other in close association, to form a volume of liquid which acts as a

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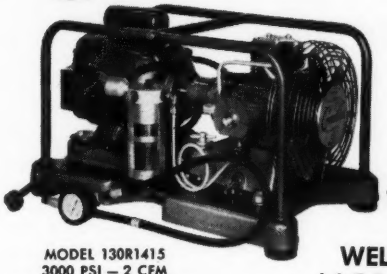

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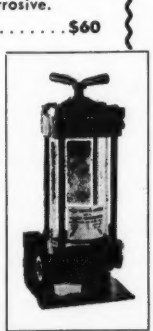

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Wet Water Advantages

To The Editor:

What are the technical and practical advantages of "Wet Water"? H.J.D.

Answer: The technical advantage of "wet water" is that it reduces the surface tension of the water which facilitates greater surface contact and penetration. This factor leads to the following practical advantages:

1. Less water is required to extinguish a fire.
2. The extinguishing time is materially shortened.
3. Effectiveness of the water is increased in Class "A" and Class "B" fires.
4. Deep seated fires such as might be encountered in upholstery, baled paper or cloth, etc., are more easily handled.
5. Runoff of water used in extinguishing a fire is generally less, which results in smaller water damage and increased salvageability of material.

In addition it has proven effective on many types of rubber fires which formerly resisted the effects of water. When used with fog streams it has proven effective on gasoline fires where plain water fog was of very little value.

Tests conducted by the Underwriters Laboratories, Inc. on cotton bale fires offer an excellent comparison. It required 12 gallons of water treated with a wetting agent to extinguish a bale fire over a 24-hour period. A similar bale fire was not extinguished in the same time period, even though 399 gallons plain water had been used in the attempt.

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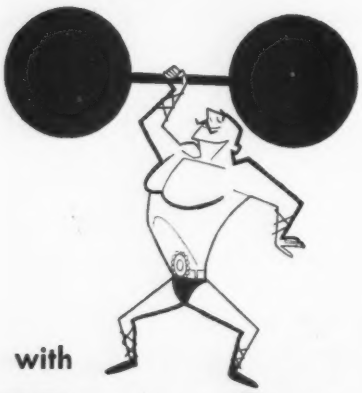

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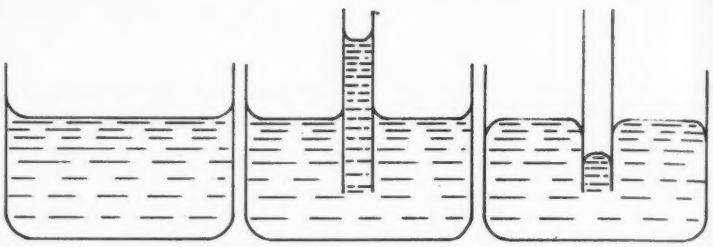

FIG. 1—A, B, C

unit. The force of adhesion enables water to cling to various surfaces. In some cases the cohesive forces are greater and the adhesive forces smaller. In others, the opposite is true.

We can expect from what we have just learned that certain distinct types of phenomena occur at the surfaces of liquids, especially water. Close examination of the surface of water in a container, will reveal that most of the surface is level. Near the walls of the vessel, however, the water will be seen to rise and appear to climb up the walls for a short distance [see Fig. 1 (A)] This effect can be better studied by using small-bore glass tubes, called "capillary tubes." When the capillary tube is put into water, the level will be seen to rise in the tube to a height much above that of the water in the larger container. The smaller the tube, the higher will the level rise. Furthermore, the surface of the water in the tube will not be plane but concave downward in a spherical shape [see Fig. 1 (B)]. Some liquid surfaces, such as mercury, will curve downward where they contact the glass walls of the container. If a capillary tube is put into the mercury, the level in the tube will be seen to fall below that in the container [see Fig. 1 (C)].

In the case of water, adhesion between water molecules and glass molecules is stronger than cohesion between water molecules alone. The water clings to the glass and creeps up the wall. Water is then said to *wet* the surface of glass.

Mercury molecules, on the other hand, are attracted to each other more strongly than they are attracted to glass molecules. Mercury *does not wet* glass surfaces.

This ability to wet specific surfaces (or the lack of this ability) is possessed in various degrees by different liquids and is the basis for referring to the liquids as "wet" or "dry."

Surface tension

Cohesion and adhesion together account for the foregoing properties of liquid surfaces. Cohesion, alone, gives rise to the property we call "surface tension," which causes the surface of liquids, especially water, to act as though it were a tightly stretched sheet. So strong is this surface layer that a needle, carefully placed upon the surface, will be supported, though the needle has a higher specific gravity than water. If closely examined, the surface under the needle will be seen to be depressed, but not broken (Fig. 2 depicts this in cross section). In a like manner, water insects are able to run about on the surface as though it were a solid pavement, dimpling the surface with each step they take.

In order to develop this concept of surface tension, we may imagine the circles A, B, C and D in Fig. 3, to represent individual molecules and the limits of the fields of force surrounding each. Again, emphasis must be given to the fact that these are extremely short range forces, and while no definite limits can be described, it can be said that forces beyond three molecules away are of no significance.

Molecule (A), in the body of the liquid, is attracted equally in all directions by molecules within the sphere of influence. The resultant force upon it is, therefore, zero.

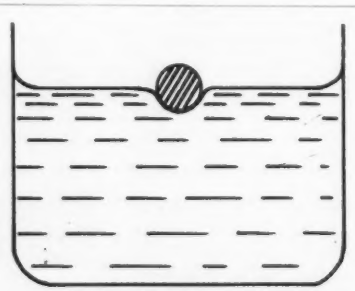

FIG. 2

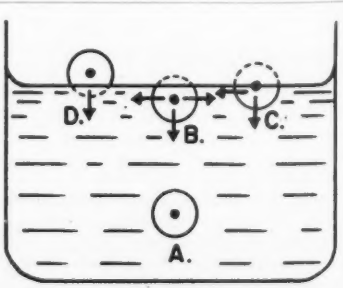

FIG. 3

Molecule (B), near the surface has more molecules below it and to the sides, than above it. As a result it experiences a pull downward which is a little stronger than that acting upward.

Molecule (C), lying just in the surface has all the molecules within its sphere of influence below it. It experiences the greatest possible force pulling downward.

Molecule (D), moving just above the surface, has all of its molecules within the sphere of influence directly below it. It experiences a strong pull downward, to prevent its escape. Unless it has a higher kinetic energy potential than average, molecule (D) will be prevented from escaping entirely, and will be dragged back into the liquid itself.

The strong cohesive forces existing between the molecules prevent all but those possessing more than average energy, from moving into the surface. As a result the molecules lying in the surface have greater energy than those in the body. There is a continual force acting to drag more and more molecules from the surface into the body of liquid. This causes the surface to be reduced to a minimum area, and satisfies the law of mechanics, which states that the system which possesses the smaller amount of potential energy is the more stable. The surface, then, resists any deformation from this condition in which the area is reduced to a minimum. Any attempt to increase the surface area is opposed by a force acting directly opposite that which is causing the expansion. The effect is that the surface acts as a tightly stretched membrane or sheet in resisting this expansion, to which we give the name "surface tension."

This tendency to reduce the surface area is illustrated most strikingly in the shape of small drops of water, such as those in a spray or in raindrops, which are known to be almost perfect spheres. Drops of water on a dusty or oily surface will also be seen to be small spheres. Of all geometric shapes, the sphere will contain the largest volume for a given surface area.

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The second part of this article will appear in an early issue.

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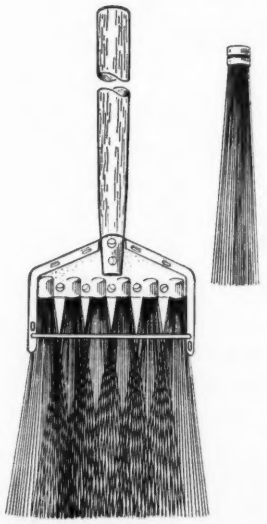

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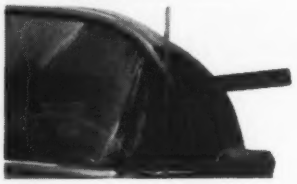

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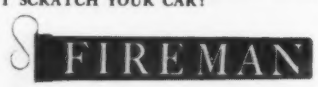

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MASTER STREAMS

Continued from page 789

is the use of fog. But water fog can't be called a master stream, some may say.

That statement may have carried some weight in the days before the 500, 1,000-gpm and over fog heads, when fog was essentially limited to hand lines.

Today, there has been sufficient progress by designers and manufacturers in the field of heavy-duty fog nozzles, coupled with tests of these master devices by foremost fire departments as well as fire colleges and schools, to warrant placing them definitely in the category of master stream appliances.

True, under some conditions, fog streams, to use the broad term, may not have the reach of the heavy, straight stream. But under certain other conditions, as when taking advantage of the wind, fog will wet down areas far beyond the range of the solid master stream. And placed in a window or other opening, a heavy fog pattern will penetrate to areas and places and kill fire that a straight stream could never reach.

Only that defense is sound which gets water on the fire, or gets it where it is wanted in volume to prevent extension of the fire. On this theory, because of the protection afforded operating personnel who are using it, and for other reasons, heavy-duty water fog is certainly of master stream calibre. If some of the proposed plans materialize to adopt it for large-scale defense as might be necessitated should an enemy attack, we may witness a shift in fire defense tactics as important as that created by the advent of the fog nozzle itself.

Memphis Practices

In its August 1955 issue, FIRE ENGINEERING reported on the use of fog nozzles and master stream devices by the Memphis Fire Department under Commissioner Claude Armour and Chief John Klinck.

Memphis was one of the first to equip its fire department with such appliances. Although it met with considerable success, to quote the department, the fog equipment at that time was limited to 2½-inch or smaller hose and except for cenventional deck guns and ladder pipes, there was no special equipment for getting the best performance out of the layouts.

Following a major fire in 1951, which demonstrated the great need for some sort of apparatus capable of discharging master fog streams, the department rebuilt an old salvage wagon and fitted it with a deck gun and fog nozzle which soon after proved its worth in stopping a raging fire. Later, another salvage truck was converted and mounted a similar deck gun and large fog nozzle.

Good as these rigs were, they were makeshifts and were unable to take fullest possible advantage of large-capacity fog nozzles. Under direction of Chief Klinck a combined salvage-deluge truck was therefore designed and built. This

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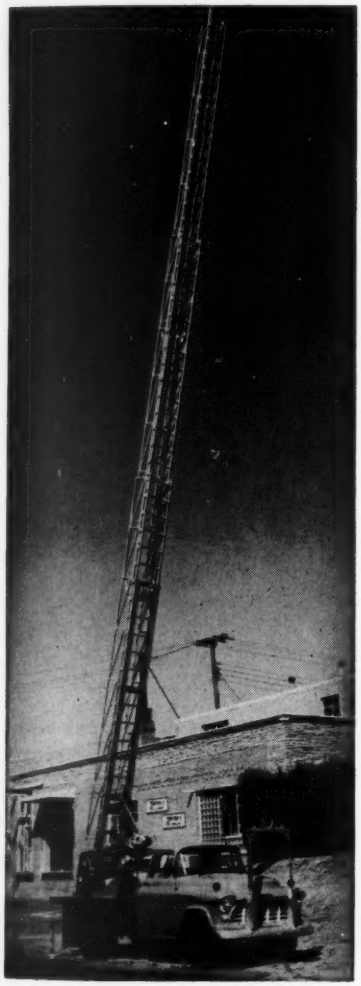

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mounted a deck gun capable of discharging 1,500 gpm. The gun was fed by a manifold from the rear of the apparatus, having six 2½-inch inlets. Three preconnected 100-foot lines are carried on the vehicle permitting it to move from one point to another during fire fighting operations without shutting down the lines.

In 1954, an identical unit was placed in service. Chief Klinck's primary thought in locating these large master fog guns on special trucks was to have one on hand at every alarm fire. Not long after, another old salvage truck was converted. This was equipped with a deck gun, JN-200 nozzle and a four-inlet manifold at the rear of the unit. The unit with big gun was able to discharge better than 1,000 gpm. Not fully satisfied, later that year, Chief Klinck designed an additional fog unit, designated as a deck wagon. This rig is in effect a self-contained mobile heavy-duty fog gun. The unit incorporates a header, supplied by a maximum of six 3-inch hose lines. This header in turn, is connected to a 6-inch feed pipe which supplies water to the deck gun, which in turn is fitted with a nozzle capable of discharging a 2,000-gpm stream. If the need arises, the fog nozzle can be removed from the gun and solid stream tips up to 2¼-inch diameter substituted.

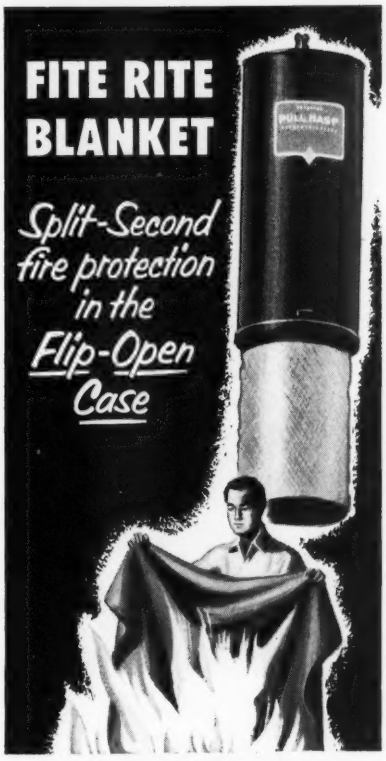
In addition, the truck carries a complete assortment of various specially designed and built fog applicators which may be included in the master stream device category. In 1954, the department introduced what it termed "The Memphis Stream Master," which basically is a portable deck gun supplied by two 2½-inch lines siamesed into the rear of the appliance. The water travels through a curved steel pipe into a short section of 2½-inch hose, to which is attached a JN-200 fog nozzle. This will discharge 600 gpm of fog. Solid stream tips will boost the discharge to 800 gpm if desired.

The department currently has over 13 of the stream masters in active service. In addition, numerous special master stream devices for applying fog to basements, attic areas and other hard-to-reach places have been designed and are in service. Through these special master appliances, the department considers itself capable of setting up master stream fog, as well as straight stream defense, against the most severe fire the department may encounter. Already it has proved its ability to do this at several multiple alarm blazes. However, Chief Klinck and his men are not resting content—they are designing even bigger, more powerful master appliances.

Other cities

Memphis isn't the only city to overhaul and redesign its defenses. New Haven, Conn., under Chief Thomas Collins, has continued to develop the fog defense plans originally inspired by former Chief Paul P. Heinz. Over the years, New Haven has made much use of its "deluge" and "battery" trucks; today large-scale water fog is permanently established in the techniques and facilities of the present department. The story of this progress has been detailed by FIRE ENGINEERING.

New York City has replaced its water



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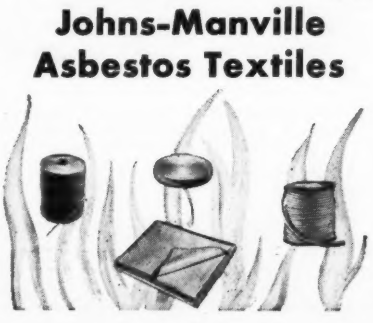

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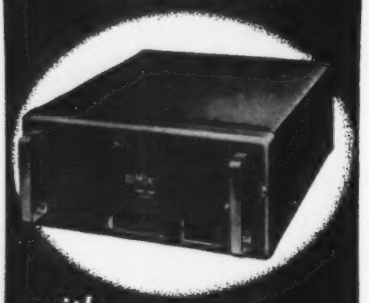

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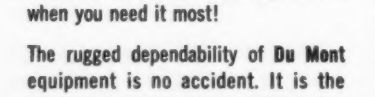

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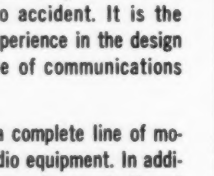

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towers with metal aerial ladders mounting two pipes, one at the tip of the fly and one at the intermediate point. These master stream pipes will deliver a total of well over 1,000 gpm if desired. When the department's entire inventory of aerial ladders is equipped, it will be able to set up an impregnable master stream defense, particularly when these streams are augmented by batteries of powerful master streams from pumpers, hose wagons and other rigs. □□

SPRINKLERS

Continued from page 795

matic sprinklers. To translate $100 billion into more understandable terms, first convert the money into silver dollars; then load them on box cars. The train would well extend over three times around the earth at the equator. This illustration suggests that automatic sprinkler protection is a paramount means of protecting American lives and property against destruction by fire.

How effective is automatic sprinkler protection? Over the past 30 years sprinklers have extinguished or controlled 96.2 per cent of the almost 59,000 fires which have occurred in sprinklered occupancies, and have been tabulated and reported on by the National Fire Protection Association. This record is a little short of phenomenal but in this land of miracles, the difficult is done immediately; the impossible takes a little longer. We, in the automatic sprinkler industry, realize that the human element figures so strongly in this 3.8 per cent of inefficiency with which we are charged that only a national inspection service, better maintenance, more widespread use of central station automatic sprinkler supervisory service can help to close the gap.

The fireman's role

The strongest and most important alliance in the field of fire protection today resides in the relationship between the fire services and the automatic sprinkler industry. As sprinklers have been called "the first line of defense against fire" and "the fireman's best friend," so the automatic sprinkler industry regards the fireman as its most important ally. Knowledge on the part of the men of the fire service can do more than any single factor to cut down the nation's increasing fire losses. To reduce this to practical and concrete suggestions, the sprinkler protection program of the fire services may be envisioned as having three phases of considerations:

1. Before the fire, or the inspection phase
2. During the fire, or the fire fighting phase
3. After the fire

First: Before the fire

1. Know what properties are protected by automatic sprinklers within your fire district.
2. Know where the control valves to the sprinkler systems are located and other important facts concerning the automatic sprinkler system.
3. Know where the fire department or siamese connections are located.

During periodic inspections, firemen should impress upon buildings' owners, tenants and maintenance men the importance of system control valves being open at all times; a closed valve means that there is no sprinkler system. A large percentage of unsatisfactory performance is due to closed control valves.

Secondly: During the fire

1. Immediately upon arrival, connect to the siamese connection in order that supply to the system can be continued at pressure and volume.
2. Be sure not to rob the sprinkler system by taking water from the system itself and diverting it to hand lines.
3. If possible, check to make sure that all control valves are open.
4. If the sprinkler system has a gravity tank and there is a department supply inlet, a hose line from the pumper should be connected to this connection and water supplied to the tank in the necessary amount.
5. Be able to properly identify a post indicator and other control valves and be sure that they are open.
6. Do not close any control valve until the fire is extinguished or until you are certain the fire is under control; then station a fireman at the control valve so that it can be opened immediately if the fire is rekindled. A large part of the 3.8 per cent of unsatisfactory performance comes from closing valves too soon.
7. Contact the building superintendent or engineer if lacking information on sprinkler system, water supply, etc.

Thirdly: After the fire

1. Close the control valve, again making sure that the fire is completely extinguished.
2. Drain the system.
3. Replace sprinkler heads where needed. In this respect all the fire companies should carry a limited supply of sprinkler heads on the truck, making sure the heads are of proper temperature. Note: Companies may profitably carry sprinkler tongs, plugs or wedges for shutting off individual heads in time of accidental opening.
4. Close the drain valve and open the control valves, restoring the sprinkler system to operation. In the event that this procedure cannot be followed, it is recommended that a fireman be stationed at the building to see that the owner or tenant properly restores the sprinkler system to operation.

If these simple procedures are followed,

both the fire services and the automatic sprinkler industry can be assured that the job to which they have dedicated themselves can be accomplished to a greater degree than has ever been possible in the past.

Enlightened and progressive fire fighters have come to accept, in recent years, the automatic sprinkler as their greatest ally.

Speaking before the International Association of Fire Chiefs at their annual convention in Miami, Fla., on November 12, 1956, Chief William Fitzgerald of Seattle, Wash., then president of that organization said:

"Fire chiefs by actual experience in the field know that automatic sprinklers supplemented by supervised fire alarm systems are the highest and best form of fire protection. Yet they, the chiefs, have done little in an organized way, not only to publicize this fact but to sell the idea to the nation and to invoke an international campaign aimed at installing automatic sprinklers and supervised fire alarms in every building that is a potentially large fire. I commend this to you as a field where we may reap the greatest fire protection dividends ever achieved."

Chief Fitzgerald is only one of thousands of modern fire fighters who are attempting to face up to the realities of present-day needs of improved fire fighting and the aid which can be expected of automatic sprinkler protection.

The fire services today confront the greatest challenge in their history. The direct fire losses in buildings and contents alone last year exceeded $1 billion. Bear in mind that this is the actual fire loss paid. It is stated with authority that the intangibles exceed by five times the actual physical fire damage to any property; bear in mind also that these intangibles are paid for with the same kind of dollars. The task is of gigantic magnitude. The job of turning back this growing tide of fire holocausts is fundamentally yours. Automatic sprinklers can be your strongest ally. It is incumbent upon every enlightened fire fighter to push aggressively his own community toward codes and ordinances that will bring sprinkler protection to his fire district, particularly where loss of life is concerned.

To you fire chiefs I say sprinklers will enable your fire department to do a better, more efficient job. They reduce the danger from fire to not only the public generally, but also to you and your fellow fire fighters. They are the advance guard of the fire service. They are present at the fire's inception. They go to work immediately and automatically, and discharge water only where the fire exists. Smoke, poison gases and heat do not intimidate them. Bear in mind when you approach a fire in a sprinklered property, on the ceiling of that building is a fire department with "charged" nozzles spaced at proper intervals. In this system of piping is just what you are bringing to that fire, namely, water. Remember, when the alarm rings at your fire station and you know that a fire exists in a sprinklered building, the sprinklers will be there ahead of you, helping to make your job easier and safer. □□

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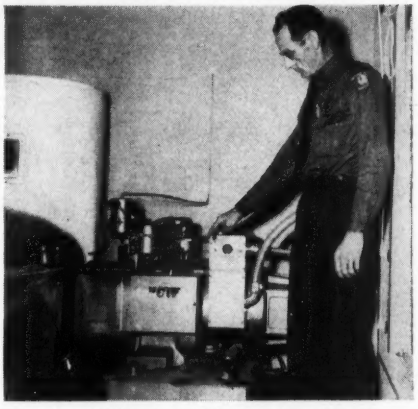

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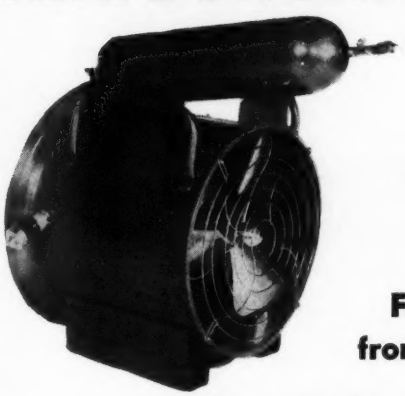

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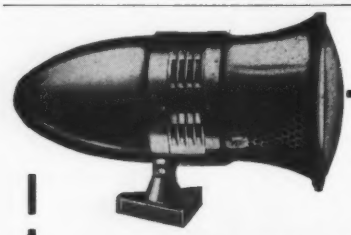

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BALTIMORE SCHOOL

Continued from page 770

the school's facilities—not to overlook simple calesthenics.

"We have seven weeks to train these men," said Chief Thomas, "and when they graduate they have training which would take them two years to acquire in a fire company. Of course that means we're all business here; there is no foolishness, with so little time to work in."

Men get so many hours of instruction at the school; on week ends they report to the companies to which they will be assigned for the first six months after graduating from the school. They then receive on-the-job training to implement their schooling.

Trainees wear special uniforms and insignia and upon graduation are presented their regulation uniforms after which they start working 7 to 5, 5 to 7 shifts instead of the 8 to 4 p.m. day as 'probies.' They will start at $4,000 and, if they put into practice all that they have learned at school and will apply themselves, they will stand a good chance of promotion.

In addition to the schooling of new recruits, the school also trains its veteran fire fighters in the latest methods and techniques. Firemen also use the school at the company level.

Already the benefits of the new installation are making themselves manifest. Already the Baltimore Fire Department Fire School is attracting the attention of fire fighters from all parts of this country —and abroad. □□

FIRE-RETARDANT PAINTS

Continued from page 826

the other half of the same wall, protected with two coats of listed fire retardant paint resisted this fire attack for more than 30 minutes, thus giving the fire department an extra 20-25 minutes to get on the job with its hose lines in full play. Such an extra time allowance frequently means the difference between an insignificant, easily adjusted fire damage, as against a total fire loss.

The intumescent*** type fire-retardant paints actually build up a fire and heat insulating barrier or mat against vital heat transfer. For example, a series of tests conducted by the engineering college of one of our leading universities several years ago showed that metal members protected with two coats of an intumescent-type fire-retardant paint very effectively resisted any appreciable heat transfer. Using continuous temperatures of almost 1,800 degrees on the fire side of 24-gauge steel, the thermocouples on the other side registered only 300 to 312 degrees or well below the critical point or failure zone of any steel structural members.

Fire-retardant paints, which on a basis of UL tests will provide a flamespread reduction of 50 or less, will very definitely lessen the chances of serious water

*** Intumescent—swelling or bubbling up, especially under the action of heat.

damage by eliminating 50 per cent or more of the potential flamespread hazard which normally exists on ceiling and walls painted with conventional paint, or on unpainted wood surfaces. For example, in a large area, where the surfaces have been painted with conventional paint, even where such areas have been protected with automatic sprinklers, it is still possible for a sudden flash-fire to spread and almost instantly sweep over an entire ceiling or under-roof area much faster than the sprinkler heads can actuate. However, with UL listed fire-retardant paints protecting such a ceiling there may be little or no flash or spread, thus only those heads directly above or adjacent to the starting fire would be sent into operation. The difference between the discharge of 20 heads as compared to the discharge of 200 heads could very easily mean the difference between a small amount of water damage as against many times that amount in the same fire. Here is an excellent example of where a combination of automatic sprinklers plus approved fire-retardant paint operating as a "team" would very effectively reduce the possibility of both fire loss and costly water damage. In addition, an explosion might destroy or rupture the water main, rendering the sprinkler system inoperative, or water may be lacking for some reason or other; in such cases the fire-retardant paint can serve as a secondary fire protection system offering a definite time factor in delay of the fire spread sufficient to evacuate a building and permit prompt fire fighting.

Cost of such protection

While most raw wood surfaces have a flamespread rating of approximately 100, the addition of some oil-based paints actually adds to the natural combustibility and flamespread of previously unpainted wood surfaces. In fact some coatings have added as much as 200 per cent flamespread potential. In analyzing more than 1,000 applications using approved fire-retardant paint it was found that the materials cost averaged about three and a half cents per square foot. As against this, the materials cost for a good industrial paint job will average about two cents per square foot. Inasmuch as the labor will be just the same per square foot whether you apply an approved fire-retardant paint or a good industrial paint product, then the average difference between an approved fire-retardant application versus a good industrial job would be only about one and a half cents per square foot more or only $1.50 per applied square. In other words, is it worth an extra one and a half cents per square foot to eliminate 50 per cent or more of the flamespread potential?

In regard to length of life, some of the fire rating bureaus accept these products for ten years of effective protection when applied to interior surfaces. Thus when painting for color, surface protection and light reflection it is also possible to paint for protection against that fire which might strike the plant, business or home almost any hour of the day or night. □□

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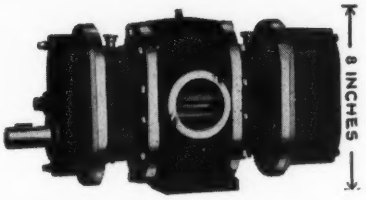

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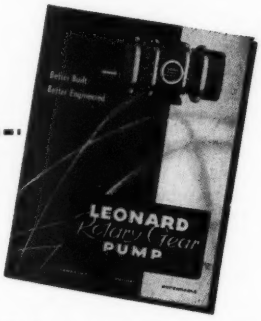

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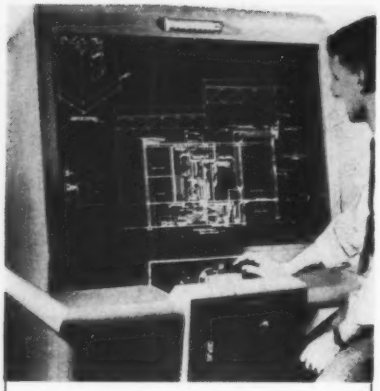

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PREVENTIVE MAINTENANCE

Continued from page 776

make a profit, and as such, the fire service will be required to pay a premium for "rush" work, and for its insistence on only work of the highest quality. Therefore, each requisition for outside service should be viewed with a critical eye, and the benefits weighed pro and con. Apparently no firm rule can be established in this respect, except that which is dictated by keeping the apparatus and equipment in the best condition with a minimum of out-of-service time.

The master mechanic

The master mechanic should be a man who has had considerable fire fighting experience, and a sufficient background of experience with automotive equipment to recognize efficient operation—and to insist upon it. A better analysis of the requirements for a master mechanic would be in the nature of priorities, and I would name good supervision as the first requisite. This supervision must emphasize the quality of work rather than production. Second in importance is the benefit to be derived from having a supervisor who has been in fire fighting a sufficient length of time to personally know the demands and limitations of equipment. With this experience he will know whether or not sufficient attention is being paid to detail, and it will aid in the further aspect of the job, that having to do with specifications for apparatus and equipment.

Naturally, the master mechanic must have some mechanical knowledge, but not necessarily to the extent that he be able to do the actual work. It is sufficient if he recognizes whether or not a piece of fire fighting apparatus is functioning properly and that repairs or adjustments are necessary. He need not be the one to determine what those repairs should be or just how they should be done. Of course if he has more than a nodding acquaintance with shop tools and procedures, those assets will make his job just so much easier and more efficient.

In the City of Milwaukee all purchase of equipment is done on a competitive sealed bid, based on specifications drawn up principally by the chief of the fire department. The master mechanic is the key man in drafting such specifications. He advises the chief concerning deficiencies which should be guarded against, improvements and innovations to be included, and other features related to the apparatus which his experience has shown will not only improve its performance efficiency, but will also tend to reduce maintenance and upkeep costs and time-out of service.

During the construction of the apparatus, the master mechanic should confer with the manufacturer and watch the progress of construction, to check on compliance with the specifications. He should also take an active and leading part in the testing of the finished product, and also carry out periodic tests thereafter for pumper performance and ladder trucks.

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The master mechanic who measures up to the requirements of his job is in a position to assist the fire chief and his aides in more ways than maintaining apparatus and equipment at required efficiency levels, and in the preparation and checking of specifications. This 'plus' service is almost limitless, depending upon the resourcefulness and capabilities of the individual and his assistants. In addition to acceptance trials and other tests of apparatus, he can aid in research and experimentation, in the development of new materials and methods, and in the training of drivers, pump operators and others in matters directly or indirectly affecting maintenance.

A fire department maintenance program will be only as successful as the constant vigilance given to it by all individuals who have a hand in the various phases of the program. This begins with the driver who must check his apparatus periodically, and continues to the chief who must insist that any failures in performance be accounted for and, if necessary, remedies promptly instituted. The wheelhorse of this program is the master mechanic, who must keep his finger on the pulse of not only his own men in the shop, but also personally check on the performance of apparatus and equipment at fires. The master mechanic must find ways to avoid emergency repairs which should have been taken care of in a routine fashion.

I know that in some cities there is a trend toward having fire apparatus repaired and maintained by other than a separate fire department shop.

Naturally, the maintenance and repair policy and program will vary with the municipality. At least one large city and a number of lesser ones, service all municipal rolling stock for all departments, fire apparatus included, under one roof. I am convinced that in major cities there is sufficient activity to justify a fire department shop, and coupled with the special demands of fire apparatus, it is not only an economically sound approach but has the added feature of being a necessity to insure efficient operation of this most important segment of municipal government in the protection of life and property.* □□

* Writing on the subject of maintenance, "Municipal Fire Administration" (1946 edition) says, "A city of 50,000 population will have a dozen or more pieces of apparatus which justifies the maintenance of facilities for performing almost any kind of repair job, even such work as complete overhaul of motors and complete rebuilding and refinishing of equipment." It also adds: "While it is generally conceded that the fire department should have its own repair shop, there are many advantages in having all garage work centralized at a municipal garage where special mechanics familiar with fire apparatus can be assigned to such work including the construction, reconstruction, and repair of apparatus and equipment." . . . and this authority closes in agreement with Chief Wischer, i.e., "The separation of fire apparatus maintenance from other city motor equipment repair work may be justified in view of the special service performed by the fire fighting equipment, the urgent need for getting the work done quickly, and the special training of mechanics . . . the fire chief cannot be handicapped in performing his work because the execution of fire fighting activities is the only reason why the equipment is employed at all."—*The Editors*

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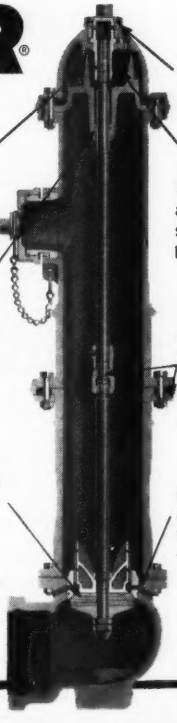

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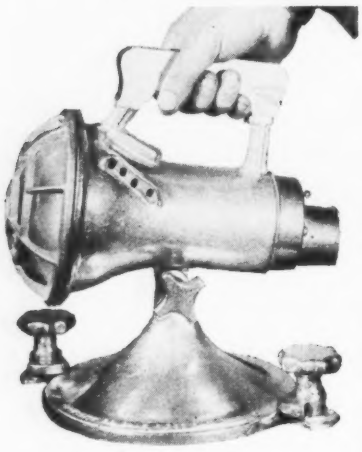

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the round table

discussion of current fire department and fire management problems

Ladders on Pumpers

THIS IS THE THIRD installment of the Round Table on placement of ladders on pumpers.

The generous response from our readers makes it necessary to carry the discussion over to the September issue. The editors will welcome any additional comments on the subject. Address replies to Round Table Editor, FIRE ENGINEERING, 305 East 45th Street, New York 17, N. Y.

Discussion of the Subject

Harold R. Rasmussen, Chief, Joliet, Ill.: We carry side ladders on our pumpers. They are delivered so equipped and we do find use for them occasionally. We are sometimes called on to let in someone who has locked himself out or to rescue a dog in a creek which has a high retaining wall. Using the ladders from the pumper eliminates the sending out of an aerial. At fires we ordinarily use the ladders from the aerial truck.

The side ladders on our pumpers are all steel with the exception of one. They are all 24-foot extension with a 12-foot roof ladder.

We have two booster trucks which have these ladders on them. They also make calls outside the city limits. We have occasion to use the ladders from these trucks, as we do not send any other equipment outside the city limits. These ladders would be the only available ones.

John Schweder, Chief, Bethlehem, Pa.: We carry wood side ladders on our pumpers. One is a 24-foot extension ladder and the other a 12-foot roof ladder.

I find that in so equipping our pumpers, it is easier to remove the ladders with an undermanned crew. I believe it is easier to pack hose and not be hindered by an overhead ladder rack.

R. L. Rudd, Chief, Fort Smith, Ark.: Our pumpers carry one wood 12-foot straight ladder and one wood 24-foot extension ladder.

Most of the time, at least one pumper arrives at the fire before a ladder company and ladders are used from the pumper. Ladders on the pumper are more accessible and can be taken from the truck more quickly than from a ladder truck where it is necessary to release the ladders and remove them from a cluster of larger ladders.

The above comments hold true primarily for residential areas and do not mean that we do not use our ladder trucks in those areas. Ladder trucks are always used in the high value districts.

Wallie Paddock, Chief, Caldwell, Idaho: We carry side ladders on our pumpers. These are of both wood and metal. I prefer the wood, however, even though they require more maintenance because the wood is much safer when used where there are electric wires. They can also be used to make a rescue from an energized area.

Frank W. Everett, Chief, Rochester, Minn.: We carry side ladders on all pumpers. Some are wood and others are metal and include 24-foot extension and 12-foot roof ladders.

We find this practice to be advantageous in that where you have engine companies alone in outlying stations, they can use short ladders until the ladder company gets there.

R. L. Shortridge, Chief, Brainerd, Minn.: We carry a two-section 28-foot metal ladder on a carrier over the hose load that extends into the cab of the engine. We would like to have brackets mounted on the side of the truck, but feel it would be too expensive at this time. We would like to have a 20 or 24-foot ladder instead of the 28-foot.

These ladders are used for still alarms and for fires in garages and small buildings and also for cocklofts and attics. On regular alarms we send the ladder truck.

With the overhead carrier, loading hose is very difficult.

John L. Keefer, Captain, Nichols Hills, Oklahoma City, Okla.: The Nichols Hills Fire Department carries on their 500-gallon pumper one 24-foot extension ladder and a 14-foot roof ladder. Due to limited space, our squad truck which operates at the fire, carries a 10-foot folding attic ladder.

At a fire where the building has to be laddered, we have found that we are

THIS MONTH'S QUESTIONS

Do you carry side ladders on your pumpers?

If you do, what type (wood or metal) and what sizes?

What advantages do you find in so equipping your pumpers?

If you do not carry any ladders on pumpers, what are your reasons for not doing so?

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short of ladders not only in number but also in length. In the specifications for our new 1000-gallon pumper, which have been drawn up by Chief E. D. Kirkpatrick and our two captains, we have specified one 35-foot three-piece extension ladder, one 16-foot roof ladder and a 12-foot folding attic ladder. These ladders will all be of aluminum. We are also going to replace the 24-foot extension on the 500-gallon pumper with a 35-foot, three-piece extension ladder.

On mutual aid runs, it has been noted by the officers of the department that there is usually a shortage of ladders because very few departments will send a ladder truck out of town. Also with ladders on all pumpers, they become self-contained units and can go into operation without waiting for a ladder company to reach the scene of the emergency.

Dean B. Muhlestein, Chief, Provo, Utah: We carry one 24-extension and one 12-foot roof ladder on our pumpers. These are of metal.

At times, a single pumper responds to a fire. Therefore each piece of equipment must be equipped with ladders.

Sidney F. Morse, Chief, Billings, Mont.: We do carry side ladders on our pumpers. These are of wood and include a 12 or 14-foot roof ladder and a 20 or 24-foot extension ladder. Some pumpers carry an 8 or 10-foot baby extension ladder for entering scuttle holes located in closets. These prove very practical.

Since we run pumpers to all fires, the ladders are always available, particularly in residential areas where we do not ordinarily send ladder trucks.

A. A. Girard, Chief, Pocatello, Ida.: We carry wood attic ladders and 6 and 24-foot aluminum ladders on our pumpers. This equipment answers calls in areas where it is necessary to have these types of ladders.

D. Clawson, Chief, Winnipeg, Man.: We carry one 30-foot heavy duty aluminum extension ladder, one 12-foot heavy duty aluminum roof ladder, one 16-foot wood extension and a 12-foot ladder for tonging sprinkler heads and getting into small spaces.

Without ladders, our apparatus would not be a complete operating unit.

J. N. Richardson, Chief, Beaumont, Tex.: We carry 35-foot, 24-foot and 14-foot extension ladders on our pumpers. These are of wood.

Aerial trucks do not answer alarms in areas outside the district nor do they respond to still alarms, where only one pumper is dispatched.

C. L. Cox, Chief, Durham, N. C.: All our pumpers are equipped with a 24-foot, two-section and a 14-foot two-section metal extension ladder. We prefer metal to wood for two reasons: First they are lighter and secondly, they do not require as much maintenance.

The main reason for equipping all pumping engines with these two ladders is that in general, most of our fire fighting

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operations in dwellings are carried on inside the building. The 14-foot extension ladder enables men to get into attics quickly and easily. If there should be a need for fire fighting through windows, the 24-foot ladder serves very well.

One big advantage in having pumpers so equipped is that service ladder trucks or aerials may not be available in every instance. Personnel on these pumping units, because they are well trained in the use of all the equipment carried, do a very fine job even with limited manpower.

Harris Hancock, Chief, Lawton, Okla.: We carry one 16-foot roof ladder, one 24-foot extension ladder, and one 14-foot attic ladder on all pumpers. These are of wood.

The advantage of such practice is that men can reach all buildings of two stories and less without an aerial truck. We have never found a need for any other ladder on runs where only a pumper responds. All building fires that might have required other types of laddering have been taken care of by the response of an aerial ladder. This is all set forth in our standard running procedure.

A shorter attic ladder might be better on the pumper.

C. F. Dreves, Chief, Tampa, Fla.: We carry metal ladders, 28 feet, 30 feet and 35 feet in length.

The advantage is that pumpers can operate independently of ladder trucks when necessary.

Brett Basham, Chief, Bowling Green, Ky.: We use both wood and metal ladders on our pumpers. Some pumpers carry wood ladders while others carry metal ones. The length runs from a 14-foot roof to a 24-foot extension ladder for the downtown pumpers. Substations carry ladders up to 35 feet.

I find it is very essential to have pumping engines equipped with ladders where pumpers are used on runs not made by a truck company.

Joseph H. Clements, Chief, Arlington, Va.: In our department we have 19 pumpers and two squad trucks that carry ladders.

We use both wood and metal ladders as follows:

1. All pumpers have either a 12-foot or 14-foot roof ladders.
2. All pumpers that respond with the aerial truck carry either a 24-foot or 26-foot wood extension ladder.
3. In three of our outlying companies that have scattered apartment projects over two stories high and where it takes the aerial truck over five minutes to respond, a 35-foot metal extension ladder was added in place of the 24-foot wood extension ladder (one at each station).

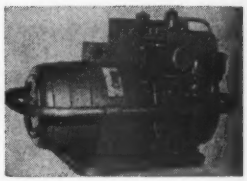
We find that the ladders carried on the pumpers are used as much as those on aerial trucks.

In most cases the pumpers are first on the scene and if ladders are needed, they are available before the truck arrives.

In our locality it would not be advisable to eliminate the pumper ladders.

Right On The Spot **a quick, dependable power source for operating electrical equipment used by modern fire departments. Katolight Portable Power Plants furnish fast auxiliary power for lights, pumps, resuscitators, other emergency equipment. Available either trailer- or bracket-mounted, capacities from 500 to 75,000 Watts and larger, with popular-make engines that can be serviced anywhere.**

NEW FOLDER Write us today for complete information and prices concerning your requirements



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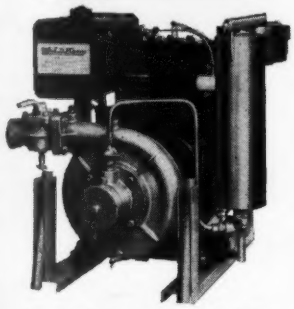
Box 891-99 Mankato, Minnesota

BADGES *of authority*

DESIGNED WITH DISTINCTION
EXECUTED IN METALS OF TIMELESS BEAUTY... WORN WITH HONOR AND RESPECT
Descriptive catalog free on request

Everson-Ross
88 CHAMBERS STREET
NEW YORK 7, N.Y.

Portable . . . lightweight
FIRE PUMP



Ward LaFrance Model D

- Husky 9 H.P. Briggs & Stratton engine.
- Exhaust primer.
- Folding handles . . . permit easy carrying.
- Aluminum, light weight, corrosion resistant pump.
- Weighs only 130 pounds.
- Compact design . . . low price.

Ideal for emergencies, stand-by protection and hundreds of other uses.

Domestic & foreign distributors wanted.
Write today—

WARD LaFRANCE
INTERNATIONAL, INC.
Elmira, N. Y.
Cable Address: "WARDTRUCK"

NEW ACME
Full Vision
"SPEC" MASK

At Last...
GAS MASK PROTECTION
For Eye-Glass Wearers

If you wear eye glasses, you no longer have to put up with the hazard of ill-fitting gas masks worn over your regular spectacles. This exclusive new Acme "Spec" mask now gives you a face piece with all the proved Acme safety features PLUS built-in eye glasses ground to your individual prescription.

You can get the Acme "Spec" mask complete with personal lenses by sending your doctor's prescription with your order. Or, if you prefer, the mask can be furnished with stirrup, bracket and front ready for your doctor to mount your proper lenses.

Either way, you get perfect vision, safety and comfort along with the Acme advantage of one face piece serving multiple uses.

For details on this timely Acme development, write for Bulletin No. 576 and No. 576-A (Prescription Form).

ACME PROTECTION EQUIPMENT COMPANY
1215 Kalamazoo Street, South Haven, Michigan

Obituaries

Dr. Barry J. Barrodale

Dr. Barry J. Barrodale, 51, secretary-treasurer of the Southwestern Association of Fire Chiefs died of a heart attack July 26 at the Terrebonne General Hospital, Houma, La. He was secretary of the Louisiana Firemen's Association for 20 years.

Dr. Barrodale, a dentist, was an international figure in amateur athletics. He was a past president of the Southern Amateur Athletic Union and in 1952 was manager of the United States boxing team in the Olympics. He is credited with having discovered present world heavyweight champion, Floyd Patterson.

He was to have served as master of ceremonies at the banquet at the I.A.F.C. Conference in New Orleans.

Willard H. Johnson

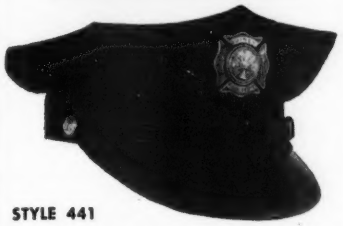
Willard H. Johnson, 55, engineer and editor with the National Board of Fire Underwriters died suddenly on July 17 at his home in Summit, N. J. Mr. Johnson was office engineer in charge of editing reports based on municipal fire protection surveys.

Mr. Johnson was born in Torrington, Conn., and graduated from Tufts College. During World War II he was a colonel in the Army Corps of Engineers and served in the China-Burma-India theater, where he was cited five times. Prior to the war he had worked as an engineer on several construction projects and at one time was city manager of Rehoboth Beach, Del. He joined the National Board in 1940.

William A. Espey

Chief William A. Espey, 74, retired superintendent of the New York Fire Patrol died July 4, following an operation. Chief Espey was born in Brooklyn in 1883 and was appointed an assistant inspector of the fire patrol by the New York Board of Fire Underwriters in 1912.

SPECIFY *Comfortable*
WENTWORTH
"HEAD-MASTER"®
FIRE FIGHTERS
UNIFORM CAPS



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"HEAD-MASTER" Styles include Bell tops, 8-Points, Air Force, Military Pershings, etc. Write for complete catalog.

All HEAD-MASTERS are made by Union Craftsmen with long, long, experience and know-how. All cloths are 100% wool, preshrunk and waterproofed. Only the finest standard materials are used.

This combination gives you the finest Uniform caps made anywhere.

For Styling, comfort, quality, and durability always specify HEAD-MASTER Uniform Caps and be sure of the finest. They are guaranteed unconditionally to give complete satisfaction.

Order Direct or thru your regular dealer.

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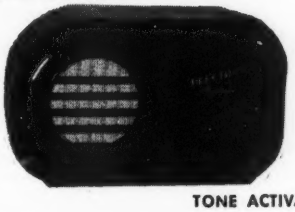
ESTABLISHED 1895

PLECTRON
Fyrcall

CRYSTAL CONTROLLED



TONE ACTIVATED

High Frequency Radio Receiver
THE MODERN ALARM

- Buy a Fyrcall for each fireman. Send spoken alarm & instructions.
- Use present police or fire transmitter to send alarms.
- Receives only messages preceded by a tone. (1000 to 3000 cps available.)
- Manual reset button.
- Crystal frequency control.
- High volume to 3 miles with no outside antenna.
- Low cost. Low power consumption. 6 tubes & rectifier. 27 Watts.

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PLECTRON CORPORATION
Overton, Nebraska

Sensational! New! 360°
REVOLVING LIGHT

★ FREEZE-PROOF
★ WATER-PROOF
★ FADE-PROOF
★ TROUBLE-PROOF
★ EASY TO INSTALL OR REMOVE
★ MADE LIKE A FINE WATCH
★ BUILT FOR YEARS OF SERVICE

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Ultimate in a warning light! Flip the switch and instantly the parabolic mirror begins to rotate around the 100 candlepower bulb at 60 TIMES A MINUTE. Flash is so intense not only at great distances, but close by, that all traffic is immediately alerted. 9½" diameter. Heavy chrome. Stands full 11" above the roof. A beauty —and price is LOW!

Write or Wire for Beautiful Catalog or Call Your Jobber

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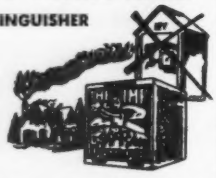
Chief---

CAN YOU PUT OUT A CHIMNEY FIRE For 65¢?
—YOU CAN WITH IMP

CHIMNEY FIRE EXTINGUISHER



Save rushing to chimney fires—avoid slippery roofs by using IMP Chimney Fire Extinguisher. Just throw a 65¢ package "as is" on the hottest part of the fire in the stove, furnace or fireplace. The chimney fire will be out in jigtime without water or chemical damage. Recommended by many chiefs who carry IMP in their cars. ALSO —LIQUID IMP for *oil fired units*, is as much a fire preventative as pkg. IMP. Saves oil, money, increases heat, prevents sludge, reduces carbon deposits and is safe. You know what a fire hazard sludge is. Use LIQUID IMP in your own burners. 3½ oz. enough for 90 gals. kerosene or 55 gals. No. 2 fuel oil; 16 oz. enough for 5 times above quantity; 1 gal. enough for 1600 gals. #2 fuel.

A fire prevented is worth more than a dozen extinguished!

USE THIS COUPON FOR YOUR ORDER

F. C. FOARD & CO., Box 481, Bridgeport 1, Conn.

Please send....doz. packages of IMP @ $7.80 per doz.
and/or .....doz. 3½ oz. Liquid IMP @ $9.00 per doz.
.....doz. pint Liquid IMP @ $27.00 per doz.
.....quarts Liquid IMP @ $4.10 per qt.
.....gallons Liquid IMP @ $14.00 per gal.

I will honor your bill f.o.b. Bridgeport.

NAME .....

ADDRESS .....

CITY..... STATE.....

FIRE EQUIPMENT DISTRIBUTORS ATTENTION!
Add package and Liquid IMP to your line.
Write TODAY for special distributor Plan.

He became assistant superintendent and inspector in 1934 and superintendent in 1939. He retired from active service on October 1, 1952.

Chief Espey was widely known as an expert on salvage and for many years was a figurehead in the International Association of Fire Chiefs. His opinions were widely sought and he lectured extensively on the subject close to his heart.

The official escort for his funeral on Monday, July 8 was headed by E. Chauncey Niver, managing vice president of the fire patrol and Chief Joseph Scanlon in charge of the patrol. The New York Fire Department assigned a detail of two companies, the Fire Department Band and the Glee Club.

George Tatnall

George Tatnall, assistant chief engineer in charge of engineering activities of the Chicago office of the National Board of Fire Underwriters, died July 10 in Chicago. He had been an employee of the National Board for nearly 35 years and had specialized in municipal fire protection problems.

Mr. Tatnall was born in Wayland, Mass., and attended Worcester Polytechnic Institute. Following his graduation in 1924 with a BS degree in Civil Engineering he joined the National Board. In 1940 he was made assistant engineer in charge and on March 1, 1957, he succeeded John H. Arnold, who retired, as assistant chief engineer in charge. He is survived by a widow and two sons.

W. E. Mallalieu

Wilbur E. Mallalieu, 83, retired general manager of the National Board of Fire Underwriters died on Saturday, July 27, in his residence in the Fairmount Hotel, Jersey City, N. J., after a long illness. Mr. Mallalieu had retired from the National Board in 1950 after 50 years with the organization. He had been general manager for 40 of these years.

Mr. Mallalieu graduated from Stevens Institute as a mechanical engineer in 1897. He joined the National Board in 1900 and for six years was an electrical inspector in the New York suburbs. In 1906 he was placed in charge of the engineering department and four years later became general agent. The title was later changed to general manager.

During his leadership the organization grew from six to some 350 employees. Its activities expanded to include almost every phase of fire prevention, fire protection and fire insurance. Activities of the engineering department were increased and separate departments were set up to cover arson and law, research, and public relations. Under his direction successive editions of the National Board's model building code were published.

Mr. Mallalieu was an honorary life member of the International Association of Fire Chiefs, a past president of the National Fire Protection Association and a trustee of the Underwriter's Laboratories; he was also a director of the Sanborn Map Co. During both world wars he

A PROVEN
Life Saver!

Every FIRE COMPANY should have a

Can be operated from portable electric generating units.

KEY-HAK
RESCUE KIT!

1 Key-Hak heavy-duty portable electric Hack Saw.

1 Blade Kit consisting of 36 assorted metal and wood cutting blades.

1 Heavy gauge Steel Carrying Case.

- Eliminates the fire hazards of a cutting torch, particularly in automotive emergency rescues.
- Affords a means of quick entry through wood and steel partitions in any emergency.
- Extracting trapped people.

If your local Fire Equipment Dealer is unable to supply you, write direct to

KEY-HAK DIVISION
PRODUCERS AND DISTRIBUTORS, INC.
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Safe, secure two, four, or six man carry with new stretcher

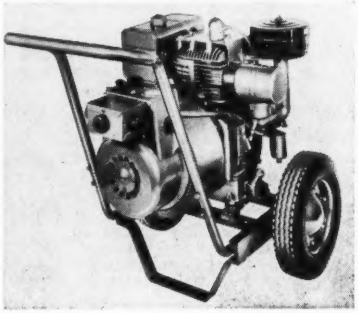
Here's another use for the versatile new Haggard's all-purpose stretcher kit. No matter what type of stretcher you now have, you have need for the new Haggard. It does all the things any stretcher can do, plus many more. It is a complete unit ready for instant use anywhere. It is so compact that it fits into a car trunk. Lightweight, only 28½ pounds complete with case, blanket, first aid supplies, and accessories. It's such a totally new concept in utility, versatility and practicality that you should investigate it at once. See how easy it is to store, transport, and put to use. See all the advanced, needed features that make it a combination litter, fracture board, traction splint, and resuscitator. Compact, convenient, complete. Ask your MSco distributor for a demonstration or write Medical Supply Company, Rockford, Illinois. In Canada, Safety Supply Company, Toronto 2.

served the government as a dollar-a-year man. In World War I he was affiliated with the Fire Prevention and Protection Division of the War Industries Board. In World War II he directed fire prevention and protection for the Army Corps of Engineers, the Bureau of Yards and Docks of the Navy Department and the Fire Protection Division of the Coast Guard.

MANUFACTURERS' NEWS

Continued from page 836

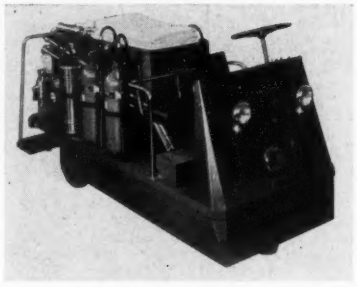
New Mobile Generator



Pioneer Gen-E-Motor Corp., 5841 West Dickens Avenue, Chicago 39, Ill., has developed a new mobile electric generator plant which is mounted on a rubber-tired dolly.

Powered by a Briggs and Stratton engine, it provides output of 2300 watts, 115 volts, 60 cycle AC, and 200 watts of 12 volts DC for charging the starter battery. Push-button starting and radio shielding are standard equipment.

New Industrial Fire Truck



A three-wheel, electric-powered industrial fire truck that can carry four or five men and a large assortment of fire fighting equipment yet makes sharp 90-degree turns in factory aisles as narrow as seven feet has been developed and produced by the Electric-Car Division of Victor Adding Machine Co., 3900 North Rockwell Street, Chicago 18, Ill.

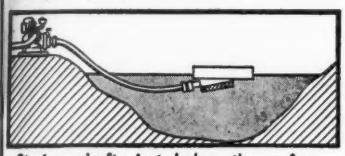
It is battery-powered with a 24-volt direct-drive motor. A built-in charger keeps the batteries ready for instant use.

Originally developed in cooperation with a leading electrical manufacturer, the Victor Dyna-Powered Fire Truck is now available generally.

Continued on page 901

ANY WATER SOURCE NOW USEABLE!

The new Float Dock Strainer makes most any stream or pond useable for fighting rural fires or for filling your tanker. Float Dock will draft in deep or shallow water — off the bottom and drafting always the cleanest water with never a whirlpool or loss of suction at any time. Saves wear on your pump, too.



Strainer drafts just below the surface and down to the last few inches.

WRITE your distributor or manufacturer for brochure and prices. Specify hose size.

Manufactured Only By
FOL-DA-TANK COMPANY
Box 361, Rock Island, Illinois

END TANK RUST, STICKY VALVES

Dakota TANK SAVER

SOLVES YOUR FIRE TRUCK MAINTENANCE PROBLEMS

Positively prevents rust in booster tank, fire pump and water system. Lubricates valves and gates to prevent sticking, dissolves lime and corrosion deposits on gate and line valves. Deposits a fine film of rust-preventive oil on all metallic surfaces. Give it a try — we know you'll reorder!

Tested and used regularly by hundreds of fire depts.

One half gallon will treat 500-gallon tank, pumps and gauges

Single gallons $4.00
Case of 4 gallons $15.00
F.O.B. Sioux Falls, S. Dak.

Order direct or from your fire equipment dealer. Fire Equip. Dealers—territories open for distribution

DAKOTA CHEMICAL COMPANY
West 12th St. Dept. E, Sioux Falls, S. D.

Want to buy U/L fire extinguishers?

or fire hose?

and accessories at very low prices but high quality?

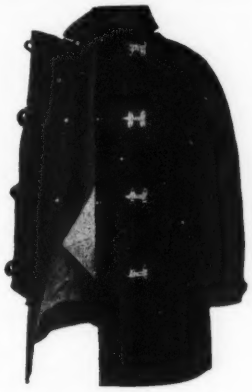
TRY—

M. L. SNYDER & SON, INC.
2417 North Jasper Street
Philadelphia 25, Pa.

We also have rubber coats, gloves, boots, etc.

Branches throughout U. S. & Can.

BODY-GUARD
BUNKER SUITS
FOR COMFORT & PROTECTION



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SIREN BOOTS

We have been supplying FIREMEN'S CLOTHING for over 36 years.

Any fireman can have a catalog by writing—

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ST. JOSEPH - - - - MISSOURI

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Rate $12 per column inch, less 10% for three or more consecutive insertions. Closing date for copy, 25th of month preceding date of issue.
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'43 International K5 High Pressure Unit—Hardie Pump—400' Booster Line 2 Reels—Front & Rear Directional Signals—350 Gallon Tank—Siren & Red Lights. $1700 or Offer.

'42 G.M.C. 6 by 6 Pumper—500 Gallon Per Minute Hale Pump On Skid Unit with Chrysler 6 Cylinder Engine—Power Take Off Winch with 200' ½" Cable—Front & Rear Directional Signals—Siren & Red Lights—Front Mounted Spotlights—300 Gallon Tank—200' Booster Hose on Reel in Rear—10' & 12½' Hard Suction—New Rebuilt Motor—This Truck is Outstanding for Grass Fires—$3500 or Offer.

CHIEF EDWIN A. GREER
North Coastside Fire Protection District
Box 207
Sharp Park, California

RECHROME and rebuild

Your old sirens. Guaranteed work done. Reasonable rates.

Convert

your six volt sirens to twelve volts.

Trade your old

sirens in on Leading brands of new sirens, and Beacon Ray Lights.
For Information write:

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SITUATION WANTED

Professional Fireman, age 43, good physical cond. 20 yrs. experience many in high value district of large city. Served as officer in engine & ladder cos, also other supervisory & administrative positions. Diplomas from City Fire School and U. S. Navy in Damage Control. Fully qualified in all phases of fire work and apparatus operation, dispatcher and alarm operator. Desires to relocate in prof. fire dept. or semi-paid dept.
JOHN J. LYNCH
230 So. 56th St. Philadelphia 39, Pa.

FOR SALE

AMBULANCES, must sell at once the following fully equipped units. 1952 Cadillac Superior, two tone, formerly used at nursing home, $2750.00. 1953 Pontiac Barnett Ambulance $1650. 1948 Pontiac Superior Ambulance, Cadillac Body, $550.00. 1942 Packard Henney Ambulance, built-in air condition unit, $275.00. For further information write:

BOX 355
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305 East 45th St., New York 17, N. Y.

POSITION WANTED

Six yrs, as Chief of 100 sq. mi. municipal, light industrial, suburban and rural area. Age 30, physically OK. Capable of organization, administration, training, public relations, typing, mimeograph work, etc. Have 17 Iowa State College fire school certificates including administration and arson. Also other certificates. Excellent references. Consider any position with paid or part paid department.

CHIEF C. BAAL JR.
SHERRILL, IOWA

POSITION WANTED

Fireman wants job. Five years experience in fire fighting, pump operator, first aid, resuscitator and ambulance. Also experience in servicing fire extinguishers. Will accept job any place in the state of Montana.

ROBERT HAHM
910 Avenue C
Billings, Montana Phone 9-8720

! FIRE HOSE SALE !

1½"x50'	SJ CRL fire hose, unused but soiled	$ .26 ft. cpld.
2½"x50'	SJ CRL fire hose, unused but soiled	$ .40 ft. cpld.

UNUSED & CLEAN FACTORY PACKED GUARANTEED PERFECT

1½"x50'	SJ CRL fire hose	$ .40 ft. cpld.
2½"x10'	hard suction hose	14.50 lg. cpld.
¾" or 1"x50'	Booster hose	.30 ft. cpld.
4"x16'	DJ soft suction hose, w/4½", cp.gs. male & long handle female	16.50 lg. cpld.
Mechanical	foam playpipes, Phomaire, less pickup tube (Worth $45.00)	8.00 ea.
Mechanical	foam playpipes, Phomaire, complete with pickup tube (Worth $55.00). Our price only	15.00 ea.
2½"	Siamese connections, plain, 1 male and 2 female, NST	4.75 ea.
2½"	Brass double female connections, NST	5.95 ea.
1½"x12"	Plain hose nozzles, brass, IPT	1.25 ea.
2½"x15"	Plain hose nozzles, brass, NST	4.25 ea.
1½"	Fog nozzles, brass 3 position, leading brands, NST or IPT	29.50 ea.

IMMEDIATE DELIVERY
ANY THREAD COUPLING CAN BE SUPPLIED ON HOSE LISTED
TOWSON HOSE & RUBBER CO.
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Phone VAlley 3-1672

FOR SALE

1929 Ahrens-Fox
1000 GPM Piston Pumper
Passed Underwriters Test Oct., 1956
Available Immediately
GOOD INTENT FIRE CO. #1
Pottsville, Pa.

BOROUGH OF YEADON PROPOSAL

The Borough of Yeadon will receive sealed bids for the sale of one 1938 Mack City Service Ladder Truck, in good condition, with one hundred (100) gallon booster tank.

Bids will be received at the office of the undersigned, Yeadon Borough Hall, Baily Road and Church Lane, Yeadon Delaware County, Pennsylvania until 8:00 P.M. Thursday, August 22, 1957 at which time bids will be publicly opened. Each bid must be accompanied with a certified check, cashier's check or treasurer's check in the sum of $100.00 payable to the order of the Borough of Yeadon, to be retained as liquidated damages in the event the successful bidder does not pay the balance of the sale price within ten days after the award of the bid. The truck may be examined at the Fire Station located in Yeadon Borough Hall. The Borough reserves the right to reject any and all bids.

BOROUGH OF YEADON
Frank R. Culp
Secretary

ANTIQUE FIRE APPARATUS DEPICTED IN COLOR ON HEAVY ABSORBENT COASTERS

Series of 4 different Rigs. Assortment of 2 dozen—GIFT WRAPPED $1.00 Ppd. 12 dozen only $4.00 Ppd. We will imprint your name or organization FREE in lots of 6 gross or more.

12 gross, less 10%; 24 gross, less 20%. Perfect for your next Banquet or Convention. Two beautifully framed matching 3¼ x 4 Fire Miniatures $3.00 Ppd.

PRICES AND SAMPLES OF OUR MATCHING COCKTAIL NAPKINS ON REQUEST.

HOBBY MATS
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Balsam Lake, Wisc.

WANTED TO BUY

Old Fire Trucks and obsolete equipment.

GORDON HAWKINS
Box 1144
Berlin, N. H.

2½" FIRE HOSE SALE

SPECIAL OFFER

Unused, clean, factory packed 2½"x50' SJ CRL fire hose, leading brands, guaranteed perfect, tested to 300 lbs.

ONLY $.55 Ft. cpld.

TOWSON HOSE & RUBBER CO.
104 WEST JOPPA ROAD
BALTIMORE 4, MD.
Phone VAlley 3-1672

STEAMERS!

Set of 6 different Amoskeag Steamers on heavy 8 x 10 paper suitable for framing. Reproduced by photography from original engravings. Real collector's items. Send for full description. All six for $5 PPD.

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Direct from manufacturer
Top quality identification plates at low cost.
Write for Circular
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Every issue of FIRE ENGINEERING has something in it that you want to keep for future reference. If you have one of our standard handy binders, you will have every article at your fingertips and a complete yearly index of everything we have published. The binder holds 24 issues and two yearly indexes.

Price $3.00

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BUILDERS OF SPECIALIZED
RESCUE AND FIRE APPARATUS

GOLD CREST
SAFETY EQUIPMENT CORP.

HIGHWAY 22 P. O. BOX 155
DUNELLEN, NEW JERSEY

CONTROLATOR
HYDRAULIC BOOSTER — HAND CONTROL
BRAKE LOCK — LINE PRESSURE GAUGE

INCREASED BRAKING AND HOLDING
PAYS FOR ITSELF
SAVES MONEY — TIME REPAIRS ACCIDENTS
FINGER FLIP CONTROL
ADDED FLUID AND POWER
GRADUALLY APPLIED OR RELEASED

MUCH MORE THAN JUST A BRAKE LOCK

A Simple Powerful
AUXILIARY HYDRAULIC BRAKE
MOUNTED BETWEEN THE MASTER CYLINDER — OR BOOSTER — AND WHEELS

MASTER OF THE ROAD — AND LOAD
GIVES BRAKES WHETHER OR NOT THE MOTOR IS RUNNING — AND IN MOST CASES IF BOOSTER OR MASTER CYLINDER FAILS. GIVES BETTER CONTROL OF EVERY STOPPING, HOLDING, AND STARTING OPERATION—WHETHER THE TERRAIN IS ROUGH OR HILLY—OR THE LOAD LIGHT OR HEAVY.

DO MORE WORK — IN LESS TIME
YOU CAN GO WHERE YOU WANT TO GO—STOP—HOLD—RELEASE —AND GET OUT—BETTER AND SAFER. OR YOU CAN MOVE A FOOT OR MILE—UPGRADE OR DOWN—WITH NO BACKROLL, OR LOSS OF CONTROL.

THOUSANDS PRAISE ITS SAFETY AND DEPENDABILITY

YOU ALWAYS KNOW
THE BRAKE PRESSURE NEEDED OR APPLIED—AND CAN CHECK THE SYSTEM FROM THE CAB — FAST AND ACCURATELY

BRAKES EASILY RELEASED
REGARDLESS OF PRESSURE — WITHOUT HARM TO MASTER CYLINDER RUBBERS

Easily Installed and Serviced
NO INTERFERENCE WITH CONVENTIONAL BRAKES

Offered By MANUFACTURERS — JOBBERS — DEALERS

POWER EQUIPMENT COMPANY
6018 Paseo • Kansas City, Missouri

Continued from page 899

Heart Activity Monitor

Anthony Associates, 63 Harbor Lane, Massapequa Park, L. I., N. Y., has developed a cardiac monitor which it is claimed will register the electrical activity of the heart after stethoscope sound and pulse rate disappear. It is called the Anthony Cardiac Monitor and is said to be useful for the immediate detection of heart activity during resuscitation. The self-contained portable unit is battery-operated and will work in any climatic condition.

Aluminized Asbestos Cloth

The safe operation of workmen in areas where temperatures exceed 2,500 degrees Fahrenheit is now claimed to be possible with protective suits made of Kamklad, manufactured by Keasbey & Mattison Co., Ambler, Pa. It is claimed this fire protective aluminized asbestos cloth reflects over 90 per cent of the radiant heat to which it is exposed. The smooth aluminum foil surface is said to resist water and oils and that flying sparks and cinders fall right off without damaging the material.

Sprinkler Visual Aids

The National Automatic Sprinkler and Fire Control Association, Room 2311, 60 East 42nd Street, New York 17, N. Y., in conjunction with the Robert Brady Company, has developed visual aids for use in instructing fire department personnel in recommended procedures of coping with sprinklered building fires. For detailed information write to the Association.

Distaff Chief Wins Contest

Chief Anne C. Allen Holst, Cedar Hill Fire Department, East Greenwich, R. I., displays Sparky doll she won in recent contest held by Clifford B. Hannay & Son Inc., manufacturers of Hannay hose reels, Westerlo, N. Y. Mrs. Holst, who founded the Cedar Hill Fire Department in 1931, balances Sparky on tool box of 1880 portable fire reel used on estate of her great uncle, Zachariah Allen, founder of Factory Mutual Fire Insurance. Mrs. Holst was one of 25 fire chiefs who won Sparky dolls.

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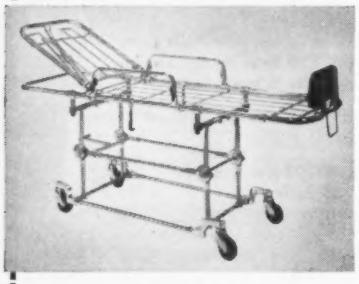

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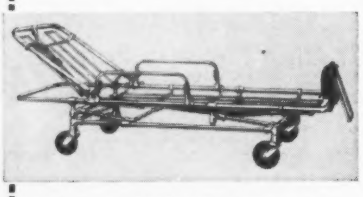

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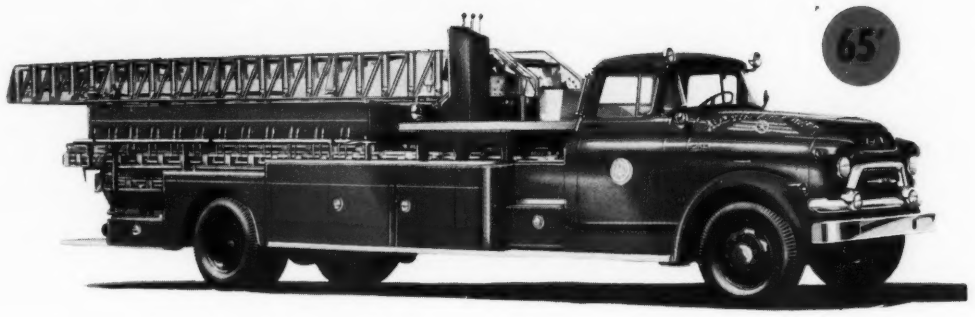

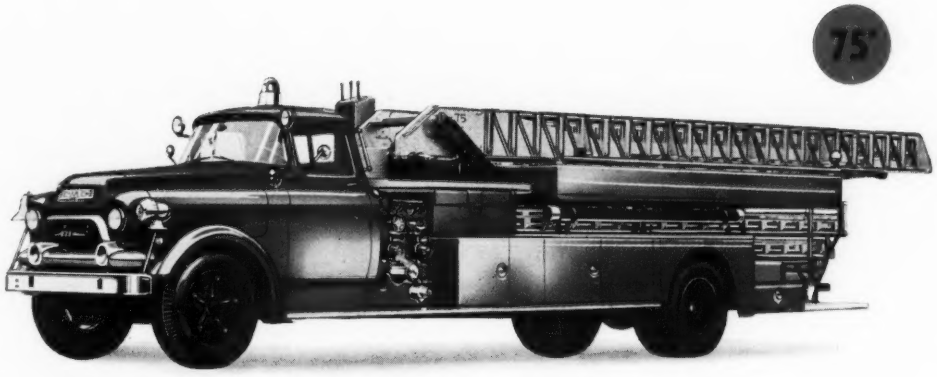

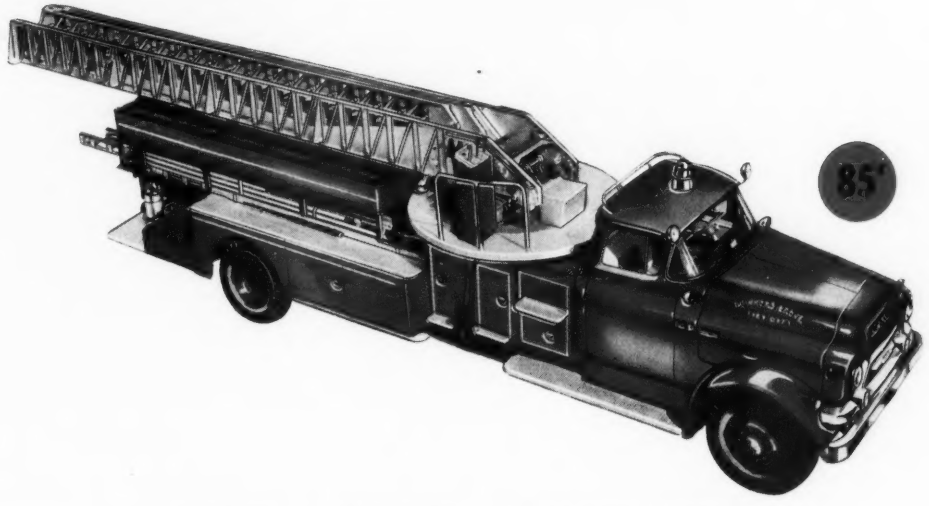

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